THE CASE for the NAVAL AVIATOR

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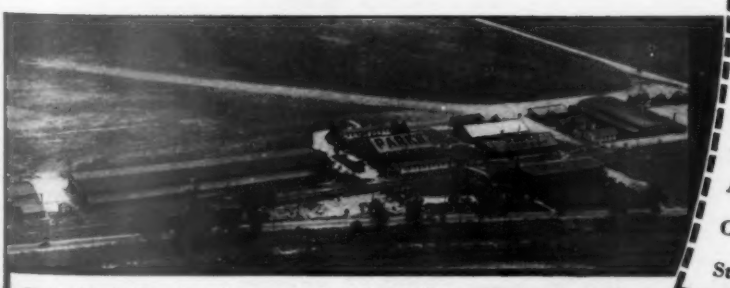

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Above: Rebuilding a Stinson SR6 in the Approved Aircraft Repair Depot of Roosevelt School.

Left: The same job with fuselage covered with fabric.

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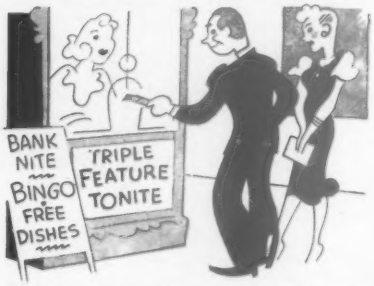

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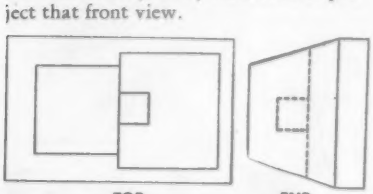
T.W.T. PROJECT #3

Last month, after reading a stack of mail that had to be written on asbestos in re allegedly hard projection problems, we made a promise.

We guaranteed to find one that would fill padded cells by the gross. We found it all right. But so much space would be required to put it in print that The Whopper Club'd be crowded right off the page. In our capacity as Literary Editor, we couldn't let us, as Puzzle Potentate, do that.

So we rustled up another. One that may possibly take some of our heckling friends a moment or two more to work out. Nothing hard, however, fellas. (heh, heh!) Shouldn't take you any time at all to project that front view.



(Old T.W.T. is waiting for the answers. Send yours in and get our solution by return mail.)

THIS MONTH'S WHOPPER

Dear Al:

Now I have a bone to pick with Norman McEwen, a real raw bone. I'm a Floridian and I won't stand for any belittling of our Florida mosquitoes. Of course, Norm is right when he says they aren't as large as the California variety. Nothing in Florida is as large as in California. Not the seeds in the oranges, not the fog on the coast, not the frost, not the and-so-forth. But when it comes to calling our mosquitoes "Pygmies", that's a downright outrage! Libelous, I calls it!

Why, I remember the time a broken control cable forced me down in the Everglades. The mosquitoes knocked me down the minute I wiggled out of the cockpit. Then they stuck in their noses and began to drink. Say, boy, you know they have 3 separate stomachs and wobble pumps from one into the other. There's no bottom to them. I could see there was going to be no end to it if I didn't do something.

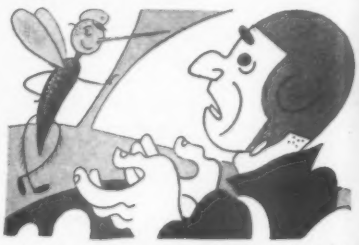
I gets up. I grabs a blade off the busted prop and carves a hole through this cloud of winged babies back to the cockpit. I pulls the closure over my head and slumps exhausted in the seat. However, there to my dismay sits a big, husky-looking old boy right on the instrument panel. He musta flown in after me. His hypodermic needle was as long as the lubber line on the

compass. He eyes me sourly for a minute. Then he opens his mouth and addresses me in perfectly good English. Says he, "Brother, I'm flight officer of this formation and I'll make a deal with you.

"It's like this," he says. "We're sick of eatin' Indians and you're the first white man we seen since Ponce De Leon. Now what we want is to git into Miami."

"But," I countered, "there's plenty of mosquitoes in Miami already."

"Yes," says he, "but *we* ain't there. And if *you* don't help *us* to git there, YOU ain't never



goin' to git there no more neither." And he glances meaningly out at the crew what was already drilling holes in the iseinglass. "I'm open to any proposition," says I. "That's better," says my Everglades Eagle. "That's better," says he and goes on. "You see it's like this" he grumbles, "me and the flight outside are pretty long-winded all right, but the 100-mile hop to Miami on the fuel we get in these swamps is just too much. So here's our proposition. If you'll unscrew the filler cap on your gas tank and let us fill up on G.A.G., we'll not only be able to make Miami nonstop ourselves but we'll hook our snouts together and build a stretcher for you to sit on and you can hitch hike right along with us."

"Can't be done," says I, "y'aint big enuf!"

"Ain't big enuf, heck!" he snorts, "You don't need *size* to git *strength* when your belly tanks is full of G.A.G.! Say, what kind of an ignorant pilot *are* you anyhow?"

"You win," I says, and pulls off the cap to the gas tank. In 3 minutes those mosquitoes had sucked my tank so dry it didn't even smell! In 3 minutes more they had woven a stretcher out of their snouts for me to sit on, and 3 minutes after that we were all sittin' on the Miami Municipal Airport, 100 miles away! If G.A.G. can put that speed into mosquitoes, what the deuce can it put into aircraft engines?

William W. Kane

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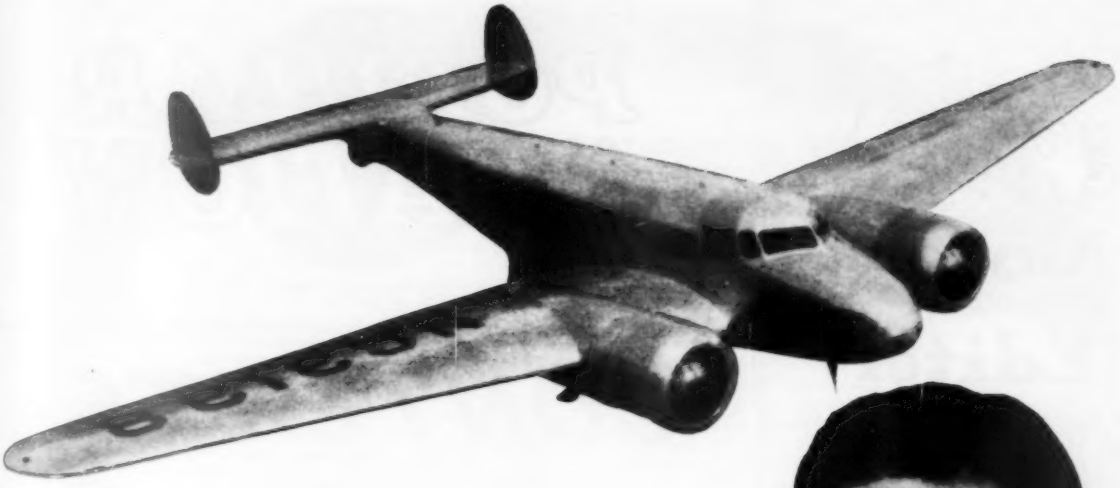

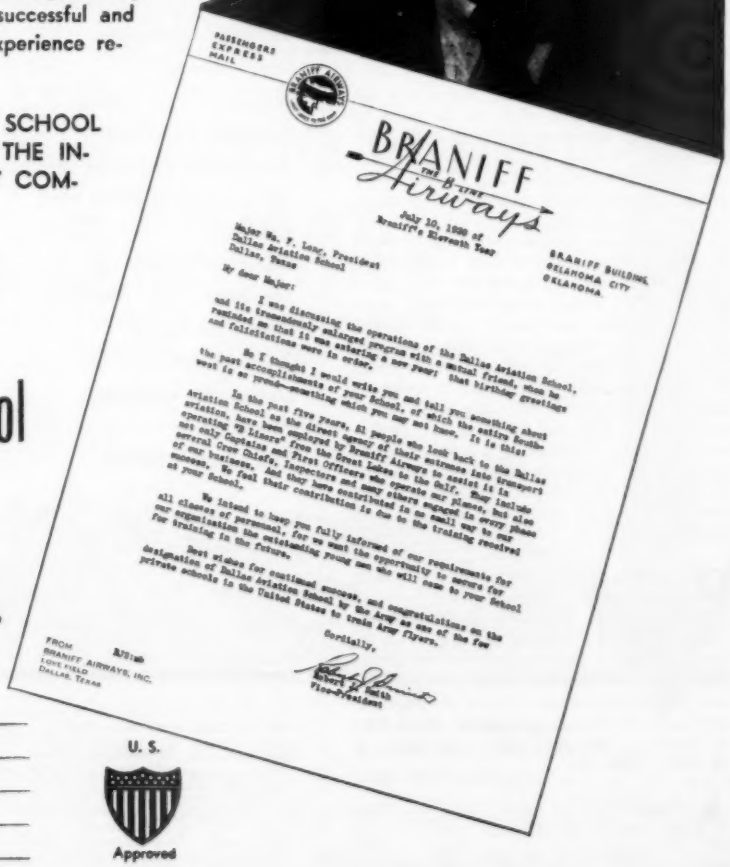

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WE are looking forward to the day when the air-minded man-on-the-street who wants to fly but can't afford it will be given a chance to do so by the Civil Aeronautics Authority. The air-minded college student already has been cared for in the CAA's highly successful training program now nearing completion. Grove Webster, chief of the CAA's private flying division, has assured us that the "average guy" will get his chance before long. We're raising our banner behind Webster in the hope that he can make that prospect become a reality. If there's anyone in aviation today who deserves all the help the Government can give him, he is the young fellow who skimps on food and clothing just so he can set aside a few dollars each week for flying time. He is the life blood of private flying today. What he means to the future of American aviation is incalculable.

* * *

WITH the National Air Races not far off we thought it might be wise to check up on the world's Number One air racer, Col. Roscoe Turner. We saw him down at the Birmingham Air Carnival and swapped stories we'd each picked up since our previous meeting. Then, when we got on the subject of air racing in general and the Turner ideas on that type of flying in particular, we knew we had something. We'd often wondered what went on behind that ever-present smile during the scorching Thompson Trophy race. He told us of such hair-raising experiences that we practically begged him to write an article on them for us. He was agreeable, but he just *had* to leave for Hollywood (where he's making a movie) immediately. But we tipped off Edward Churchill, who already was in Hollywood. The results, on page 10, ring the bell, we think.

* * *

OF course, you've seen the July issue of Reader's Digest. Which just proves that we followed a pretty good hunch when we bought Robert A. Winston's "Wheels Over Water". It's a rare treat to find a professional airman who can put his impressions down on paper as well as does Ensign Winston. Now turn to page 21 and see what you think of Winston Opus No. 2.

* * *

ALTHOUGH we asked for "The Case for the Naval Aviator" just as it is,

(*Continued on page* 83)

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PA-9

Air Racing IS HELL!

By COL. ROSCOE TURNER

as told to Edward Churchill

Col. Roscoe Turner, America's outstanding speed flyer, veteran of a score or more of gruelling air grinds, told the editors recently:

"Speed flying has made vast contributions to military and commercial aeronautics. The main advances have been made with radial motors, subjected to strains in both speed flights and closed course racing which even the makers did not believe possible.

"All racing is experimental flying. You don't know what will happen. In 1928-1929 aeromotive engineers, commercial and military pilots and racers, including myself, were of the opinion that it wasn't possible to cool a motor of much over 600 h.p. with air. Through racing experiment we have learned that more than four times this horsepower can be cooled adequately.

"In 1932 the chief engineer in one of the largest plants told me that it would be impossible to build a 300 m.p.h. airplane around a radial engine. My present motor has driven my "Miss Champion" at speeds up to 375 m.p.h., and I am confident the limit has not yet been approached."

"In 1932 the late Jimmy Wedell (right) and I got together and built three racing jobs. Jimmy hit 280 and I made 270. The next year Jimmy stepped up to 304, I to 298."

MY SHIP was up on its left wing tip, passing a slower job at No. 4 pylon when it happened. Cleveland's Thompson Trophy race was in my bag. I had one lap to go. Already I was weighing the cash against the time and money I'd put into old No. 25. You could wrap up the 1935 speed classic, put Turner on the package and send it to me.

Then the supercharger, turning at better than 30,000 revs, threw one of its six blades. That blade chewed up the entrails of my motor the way a shotgun charge tears up a small bird at too-close range.

Anything could have happened in any one of those thousands of seconds of grinding, roaring, tearing speed which made up the more than 60 minutes the race lasted. And here it was. The prop whished to an abrupt stop. Oil and smoke belched, smeared my helmet and goggles. In that split second I automatically did what I had disciplined myself to do in six years of angry, hornet-sting competition which is big time racing.

I came out of the bank and pulled back on the stick to take all the elevation 300 m.p.h. would give me. I batted at the oil on my goggles and waited, as the speed drummed out of my ship, for those flames. Long, licking needles of fire, wind-driven and hungry. My hand groped and found my parachute ring.

But no flames came. Just blinding smoke and oil. I was riding over the field, smoke-writing. One hundred and twenty-five thousand fans were waiting to see me leap. But the ship was mine. Why should I leave it?

"Hell!" I thought. "I've already dropped ten grand!"

I watched for other ships pounding around the course. I figured my gliding angle. I made a wide circle. I tried to smear the oil off my goggles, finally pushed them up. And No. 25 got in all right. Just after I nursed her over the border lights she dropped out from under me. She hit, bounced 10 feet in the air, splattered down again. We were on the ground—and safe.

It's a good thing there were no autograph hounds close. I couldn't have signed by name with my arm strapped to a board. I was shaking like a V-eight with one bank out. I'm always that way at the end of a race. So is every other pilot, if he has any sense. Because if he has sense, he knows that he's in a hazardous business and he's afraid. If you haven't sense, and therefore haven't fear, they pick you up with tongs and a basket on the back stretch.

The biggest laugh in my life is the racing pilot who says:

"I fly for the sport of it—and for the cause of aviation."

Those babies, creasing the air with those jitterbugs that don't even plan to get off the ground at less than 100 m.p.h., are in there for either of two reasons—or both.

The first is those big black headlines, that mob of handshakers, that wreath around the neck, those still and newsreel cameras, those reporters, that waving and cheering half-mile of grandstand spectators. It's nice to see people after you come back out of a wild, cockeyed, smeary world in which the trees seem to bend double.

The glory hunters!

The second is that nicely autographed check which somehow never quite balances with the cost of ship, fuel, ground

crew, time and, last but not least, the awful punishment you take.

Sport? Good of aviation? Bunk!

Backers as well as pilots are out for glory. Whether it's the closed-course Greve or Thompson, the transcontinental Bendix, or a speed dash from here to there. Their names in headlines. There isn't much sport. Flying a racing job is not only dangerous, but it's uncomfortable. It's not relaxing. You fly on your nerve. You fly every foot with the thought—the prayer:

"Thank heavens! I've gone this far!"

Never have I flown in any race competition, from the London-Melbourne classic to the Thompson dash that I haven't felt myself brushed by the wings from beyond. Sometimes twice or three times.

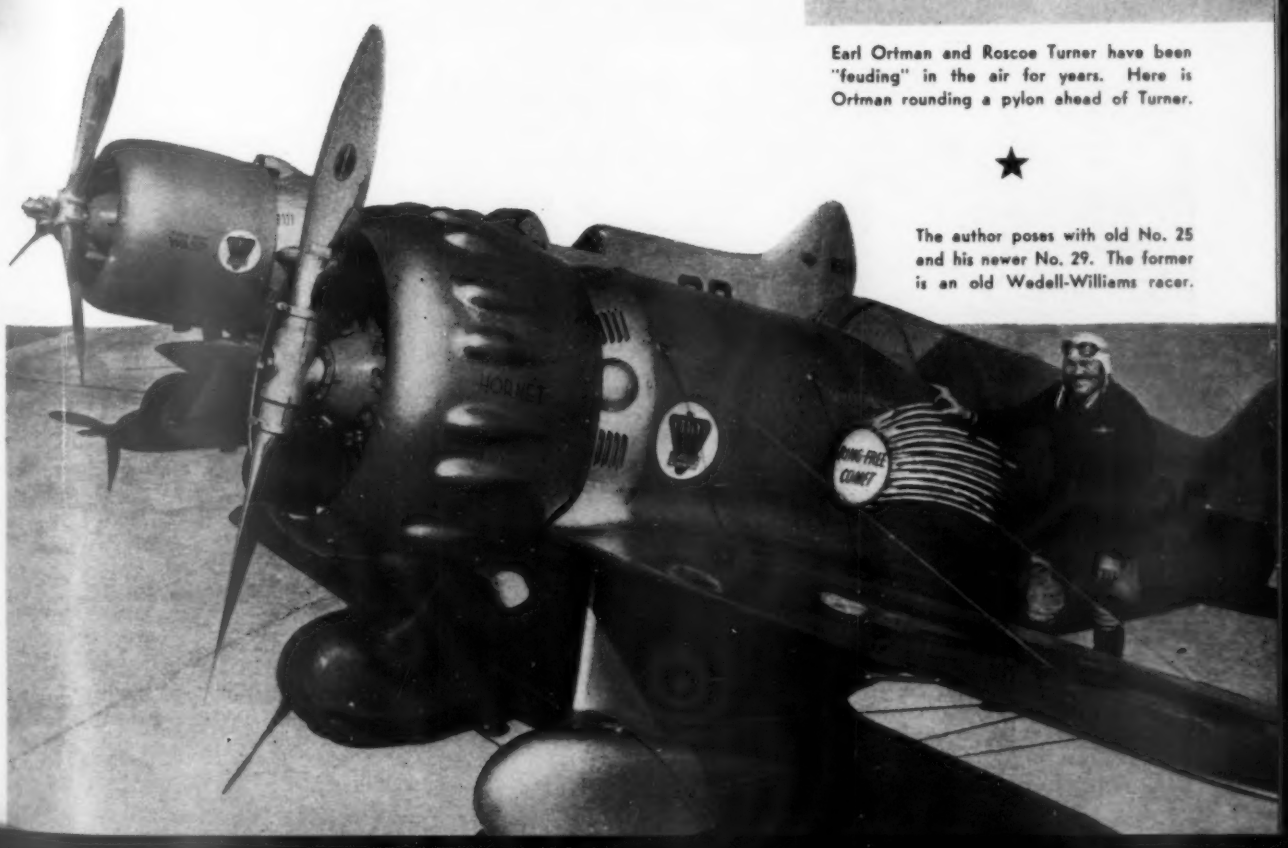
There was that time in 1932 when Jimmy Doolittle and I were flying neck-and-neck. We came within a hair of piling into each other on a pylon due to lack of visibility. Buried down deep in your cockpit, one wing to the sky, you can't see the other fellow. We came within a few feet of getting it. Jimmy pulled up, I pulled out, and it's a break we're both here today.

Why do I risk my neck?

If any man knows the inside story of air racing, he is Roscoe Turner. Here, for the first time, this famous air personage tells the hair-raising story of what passes through his mind during a race.

Earl Ortman and Roscoe Turner have been "feuding" in the air for years. Here is Ortman rounding a pylon ahead of Turner.

★



The author poses with old No. 25 and his newer No. 29. The former is an old Wedell-Williams racer.

"The race is won. I'm shaking like a leaf. But I hide it with a forced smile . . ."

Most important to me is the advertising. I've hoped to make money. But, so far, I'm still in the red in the racing field. I've grossed better than $50,000 in prize money, but I've got $100,000 tied up in old Twenty Five, which has been in service longer than any racing ship in the world to my knowledge—since 1932—and my new *Miss Champion*, which brought in $22,000 last year at Cleveland.

The advertisement means a lot—if I win. Because if someone wants my services they get a name. I have to keep everlastingly at it—with my nose to the pylon. Turner has a reputation as a speed merchant, and the minute I stop speeding I start losing in value.

Last is the roar of the crowd. I'll come right out in the open—I love it!

Much is made over the contributions which racing has made to commercial and military operations. It has. Mostly in improving motors. Back in 1932, the chief engineer of one of the largest manufacturers flatly stated to me:

"You can't build a 300 m.p.h. airplane around a radial engine."

That year the late Jimmy Wedell and I got together and we built three racing jobs. We didn't make 300, but we shoved Jimmy Doolittle to 294. Jimmy Wedell made 280 and I made 270. The next year, using the same planes, Jimmy stepped up to 304 and I clipped 298. We proved it could be done.

Today, my Pratt & Whitney-powered *Miss Champion* has been up in the 360-375 mile range, within 90 miles of Germany's 463 and within 65 of Italy's 440 with in-line engines. And I'm using only a little better than a third of their horsepower. Howard Hughes has done an official 352 with a radial.

Motor manufacturers, using the air races as a testing ground, have been stepping up their power constantly. With motors improved under the terrific, wide-open pounding which we give them on the 10-mile course at Cleveland, they've done it. In racing, a motor gets a different and harder type of service than it does either in military or commercial flying. And the motors usually come to us in experimental form. We demand to be first with the latest. If a motor goes the distance, motor manufacturers are encouraged to stretch on and beyond the old limitations.

Jimmy Haizlip, Jimmy Doolittle and all other speed flyers have contributed considerably to horsepower increases and general dependability. At the speeds we've flown them, they have not been supposed to stay together. Naturally, we've faced a lot of problems in cooling, lubrication and metallurgy. Cooling, oils and metals have been improved, motors strengthened, beefed up as needed. Every race presents a new problem—and somebody is always licking it. We have to do so to stay alive.

The Thompson race, as now flown, lasts a little over an hour. Last year, I lapped the cockeyed pylons—and I say cockeyed with a purpose—at an official speed of 283 m.p.h. Actually—and few people among the millions that watch for the results every year—realize that to do this I flew most of the time at 345 m.p.h.

Why? Because, in closed course procedure, you have to make a decision. Either you fly the pylons wide without losing much speed on the turns, thus lengthening your track, or you cut the pylons sharply and lose a lot of speed doing it. I choose to fly wide.

I say cockeyed pylons because No. 4 and Home, between which the grandstand is located, are close together and require only about 70° turns, while those marking the back stretch are farther apart and require about 110° of direction change. Sharper than a right angle.

Balance the course and make it 25 miles and you'd have a greater speed average without going faster. But then the crowd wouldn't get the thrill of the close-at-hand turns and the ships wouldn't come by the grandstand so often. Horrors!

Now, let's go around the calendar with an independent racer, which I am. By that, I mean that I'm not backed, I own my own ships—and they're built under my supervision, incorporating my ideas. At about $50,000 a throw.

Immediately after the finish of a Thompson race, we find out why I won or didn't win. That means tearing down the motor. Then I think of ways I can get more horsepower, cut down resistance. A new ship is created. Or an old one is rebuilt, refined. Maybe there's a new motor coming out. So I wait for it and, when I get it, I test it. All this takes months. The ship is ready in the late spring or, sometimes, in the later summer. Some time in August. Behind me lie months of expense, experimentation, test flights, heartaches, small triumphs. I arrive at Cleveland jittery, wondering what the other fellow has that I haven't, worried about the money I've gotten all ready to be washed down the drain.

I think my ship is right. But I must know the course. I must know where the four pylons are, what roads cross the course at what angles, what houses have red roofs and what houses green roofs, what slender trees I can pick which line up on the pylons. Always looking out the left side of any ship I can lay my hands on. Only by memorizing these strange, assorted landmarks, will I be able to know where I am going later, when I am flying 300 to 500 feet off the ground, most of the time with one wing up, one wing down, steaming away from a pylon or burning toward one. I must learn perfectly for if, in flight, I look backward in any position but that of normal flight, I will go blind.

Then I qualify. I begin to speculate. Is this fellow pushing his bug to the limit, or is he hiding out a reserve of speed?

(*Continued on page 68*)

This picture of the author was snapped just after the hair-raising forced landing he describes at the beginning of his article. The mishap cost him almost $10,000.

TIGHT TURN

This breath-taking view of a Jugoslavian Hawker Hurricane strikingly shows retractable landing gear folded in place.

These are long range patrol bombers identical to those which were ordered out in unflyable weather.

The CASE FOR THE

Hasty orders from high-ranking swivelchair pilots and a few more Naval airmen fly out to meet sudden death. An exclusive article on an almost unbelievable situation.

★

Six men died in this crash in San Diego harbor. To simulate "war" conditions, practice landings in total darkness were ordered. One flying boat landed on a beach.

THE Naval aviator—the real service flyer who can regard his wings without the pricks of conscience that must come to the "desk pilot" who got into aviation by the grace of politics and a lenient instructor, and stayed alive in it by keeping out of the air as much as possible—is becoming apprehensive of his future.

To whom do the rewards in Naval aviation go? To the fellow who takes his job seriously, who pays strict attention to flying business, who takes to heart the interests of national defense sufficiently to dare point out the need for changes in material or administration? To such an airman the rewards come—sometimes. But they often slip right by him and land in the lap of the "desk pilot," that smooth gentleman so cordially disdained by the genuine aviators who love the cockpit and abhor the swivel chair.

A rustle of complaint has been heard in recent years, occasioned primarily by the dooming of able flyers into involuntary retirement as result of the inequitable selection law. That was a starting point. Naturally reluctant to take up the cudgel in its defense and oppressed by a reactionary high command, the Navy's corps of valiant young flyers has only lately started to bestir itself.

It is taking stock of a condition not only inimical to its own morale but further deplorable because it involves the graver, deeper issue of the Navy's readiness for war and of the consequent security of the nation in a war-festered world.

Somewhere near the very center of this situation, kept effectively hushed, are the dread, the suspicion, the jealousy of aviation held by the "battleship men." Soon after the war, when such sterling officers as Capt. Henry Mustin began to demonstrate the potentialities of aviation as a sea-going arm of the Fleet, not as a separate minor force, the gold braid which loves its floating fortresses learned to fear this new gargantuan, lusty youngster. They were afraid that the airplane might eclipse the battleship as the predominant power at sea.

One of the Navy's outstanding World War aviators, retired now for physical disability, has pointed out:

"In those days, the people of Naval aviation merely wanted to prove its value so that it could help the Fleet. But there has always been a fear and distrust of aviation among the senior line officers, even after they were forced to recognize its usefulness. When aviation expanded, it was necessary to call in senior officers from the line and place them in positions of authority. These people have always had a little fear of the officer whose heart was 100 per cent in Naval aviation."

When "Jack" Towers, the world-renowned pioneer flyer who holds No. 1 experience rating in the U. S. Navy, was passed over by a selection board last year, the reason was obvious. The balance of power on that board, as in every similar group, was predominantly with the "big ship" men, led by Adm. Claude C. Bloch. What rear admiral with aspirations—yes, they still scramble for the "plum" jobs as rear admirals—

The Naval airman is a highly skilled person who should be commanded by officers he can respect.

NAVAL AVIATOR

would dare to contest the CINCUS? Selection of Jack Towers would mean having to drop some loyal officer of all-around ability on surface vessels. Towers was "passed over."

It took a certain type of courage to do this because a storm of protests engulfed their decision. Captain Towers was a symbol of aviation history to the Fleet's young flyers. How do you think their morale was affected?

The writer held many off-the-record conversations with workaday Naval airmen over this almost unbelievable verdict. One officer, internationally known for his many aeronautical achievements declared:

"Some say Jack Towers was passed over because of eye trouble. Regardless of that, as long as he's well enough not to be retired for physical disability, he should have been rewarded with a promotion for the many years he has given to Naval aviation. Frankly, this thing has got a lot of officers, who are coming up soon for selection, jittery. Their peace of mind has been seriously undermined."

Then—Navy-conscious President Roosevelt, who remembered Jack Towers from the days two decades ago when he led a trio of NC planes on the first transatlantic flight of aviation history, rebuked the selection board by making him a rear admiral and chief of the Bureau of Aeronautics.

Jack Towers, however, is a single case. Scores of splendid flyers have been sacrificed by the short-sightedness, the selfishness of the men who hold the whip and reins of the Navy, yet unfortunately have neither the imagination nor the willingness to conceive the importance of a strong aviation personnel at a time when air power decides wars and keeps peace.

EDITOR'S NOTE: ***This article is published in the sincere hope that it will benefit our country's air power. Approximately one dozen Naval aviators throughout the country cooperated in the assembling and checking of the facts in this article. We have given them the opportunity to say here what they dared not say to their superiors. Their names will not be disclosed.***

Most recently, selection boards have dumped into the ashcan of forced retirement many World War flyers who are responsible for much of the excellence of Naval aviation today. Men like Dave Rittenhouse, whose name calls to mind some of the most spectacular flying achievements of the age—and dozens of others. This is being done at a time when the Navy is expanding its air force and crying out loud that it hasn't enough capable pilots, when it has to dig into our civilian college ranks for cadets to fill out the ranks. It just doesn't make sense.

An internecine war is going on within the Navy today. It is a struggle of survival between officers who desperately seek promotion through the selection system. This system was instituted for

Capt. John H. Towers (right) was "passed over" by a Naval selection board. But President Roosevelt, indignant at the decision, made him rear admiral and chief of Naval aviation.

grades lower than commander in a hastily legislated bill in 1934, while the Fleet was at sea and without the privilege of extending hearings. Pushed through Congress by the Navy bureaucracy, the bill was designed first to eliminate "about one-half" (the estimate of Admiral Leahy, then Chief of the Bureau of Navigation) the officers commissioned from the Naval Reserve in 1920 as a reward for their World War service.

The 1934 bill was "not selection—it was elimination," in the words of Lieut. William J. Slattery, veteran Navy flyer who testified before the House Naval Affairs Committee last year. It was the elimination of many of the aviators of whom the late Admiral Sims, who hated the bureaucrats, said:

"Their brilliant exploits, their determination to win will ever remain one of the highest tributes to American manhood."

But their induction into the service left a so-called "hump" of officer personnel, and this had to be leveled to make room for the Naval Academy graduates.

"I am one of the hump," Lieutenant Slattery told the Committee. "I have been a senior grade lieutenant for 15 years and 7 months. I saw the last selection board select over my head officers who had been less than four years in the grade of lieutenant. Those boys that were selected were in high school and grammar school when I was an officer standing watch on a transport running across the war zone."

Another World War officer who quit college to make the world safe for democracy, Lieut. D. N. Logan, succinctly summarized for the Committee the bitter, beneath-the-surface struggle for promotion that began after the 1934 legislation.

"Instead of a band of brothers in arms with an *esprit de corps* having as their objective the good of the service, each officer will continue to be concerned primarily with his personal objective of becoming selected instead of his fellow officer."

This is but one phase of the deterioration of morale that threatens the Navy's air force. About 15 years ago, the Morrow Board, headed by Charles Lindbergh's late father-in-law, Senator Dwight Morrow of New Jersey, convened to examine the administrative setup of Naval aviation. One of its major recommendations—that qualified flyers be put in charge of flying units—was expected to place control of the Navy air force in the hands of men unselfishly devoted to the realization of its destiny. How that board's ideals were circumnavigated is a tragedy worth probing.

Instead of promoting the men who had been with Naval aviation since its infancy, the important commands were given to older officers of the line who became qualified aviators by a slapdash trick at Pensacola, then were rushed off to the air force to give orders to young men who had forgotten more about flying than they ever hoped to learn.

Such an apparent injustice might well have been mitigated if all these transplanted airmen had made a conscientious effort to improve their aeronautical knowledge by actual operation of the intricate, expensive machines under their command. Unfortunately, many of them went up little more than the required minimum of four hours monthly to earn their "gravy" bonus of 50 per cent over base pay for risking their lives in the air. Today, at certain stations, this is an open joke. The skipper is likely to compile much of his flight time as a passenger in a Naval transport piloted by an honest-to-goodness aviator. Rarely, if ever, does he take off in a combat plane. Rarely does he leave the ground at night. Rarely does he feel that gosh-awful sensation of taking off or landing on a rolling aircraft carrier in a rollicking sea.

An example in point is that of a commanding officer of an important air base, who qualified as a Naval aviator 11 years ago and to date has hardly more than 1,000 hours to his credit! His average has been about eight hours per month, most of it lately in safe, bulky transports on official business trips. Granted that the duties of such an officer of necessity now keep him at a desk most of his time. Has he, however, in the past acquired with such limited flying the highly specialized knowledge of the world's fastest changing science—aeronautics—which would render him competent for command of hundreds of planes in wartime?

Who ever heard of one of today's "flying" admirals and captains piloting one of the most advanced, fastest—hence, most dangerous—ships in his Wing? They're safe from the fate of such as Maj.-Gen. Oscar Westover, a genuine aviator, who like the real soldier he was, died with his boots on. He was chief of the Army Air Corps at the time.

There once was such a man in the Navy, but fate plucked him from its ranks. He was Rear Adm. William A. Moffett, who went to a heroic death—also with his boots on—in the dirigible *Akron*. Here was a man with courage and determination to see that Naval aviation got its fully proportionate share of attention in the supreme councils. Unlike some of his successors, he did not find in aviation merely something to use as a stepping-stone to personal glory. It is an open secret that one of the Navy's highest ranking officers has been more concerned over whether he would ever become commander-in-chief of the Fleet than in the welfare of the flying personnel under his leadership. His regime was needlessly tyrannical and ruthless, all for the sake of driving his men to achievements that would reflect merit on his administration. Instead, he destroyed that equanimity so necessary in an efficient air force and earned for himself the suppressed hatred of many a harassed aviator. He did *not* become CINCUS. In his obscure position today, does the conscience of this "desk pilot" ever trouble him? It should. For instance:

During the Christmas-New Year's holidays of 1937-38, a spy scare stirred the west coast. It was just after the *Panay* was bombed in the Yangtze, and there was wild, irresponsible talk of "Japanese submarines" or other war craft lurking off the coast. Fleet activity had been cut at least in half during the holidays when out of a clear sky, this

Many a Naval airman is apprehensive of what lies in store for him out at sea.

officer ordered a so-called "dawn patrol" which sent patrol bombers hundreds of miles to sea in endless hours of flight, day after day, in a tiring search for phantoms.

One day the hunt for ghost ships suddenly turned into the real thing. A plane, with its seven worn occupants, disappeared late in the afternoon after many monotonous hours of flying over empty seas. The search for these unfortunate flyers was as unsuccessful as that for the "Japanese submarines."

Some months later, more plane crews in the force commanded by this admiral met their doom in simulated war conditions during Fleet Problem 19. Pilot fatigue again was no little responsible. Forty-three aviators were killed and a dozen $200,000 patrol bombers were destroyed from August, 1937 to November, 1938 in that force. There were other reasons for the disasters than those cited —some as simple as the neglect, because of slipshod supervision, to install float lights to assist comparatively inexperienced flyers in night landings. It was a poor account to the nation of "desk pilot" stewardship over Naval aviation.

The quickest way to make the old line gold braiders throw up their hands in horror is to mention a separate air force for the Navy, constructed along the same principles as the Army Air Corps, though, of course, incorporating the peculiar characteristics of a seagoing unit that must be coordinated with the surface vessels that always will remain the backbone of the service.

A poll of the men who do the work in Naval aviation unquestionably will reveal an overwhelming preference of a divorce from the present iniquitous system, which actually places a premium on as little flying as possible. In an air force separated from the general line, the commands could fall to none who have not made a complete career of Naval aviation.

To be assured advancement in the Navy today, one must accumulate diversified duty. A flyer, to be promoted, occasionally—much too occasionally—has to cut loose from aviation *per se* to serve as navigating officer or lieutenant or something else on a capital ship. That is supposed to qualify him better for command. It is the time-honored, unchangeable Navy system of indoctrination. For two years or so, his duties in a warship probably will have no relation whatsoever to flying. Aviation is not benefitting by his avoiding airplanes. Careerists and the men whose hearts are not in the clouds have seized on this unreasonable plan to further their ambitions.

Well known in the service is the case of one particularly ambitious officer who managed to get one desirable desk billet after another, retained his wings by squeezing in the required four hours monthly, and was rewarded handsomely by superiors who seem to be able to appreciate this type of man more than they can the aviator who prefers to flirt with death daily.

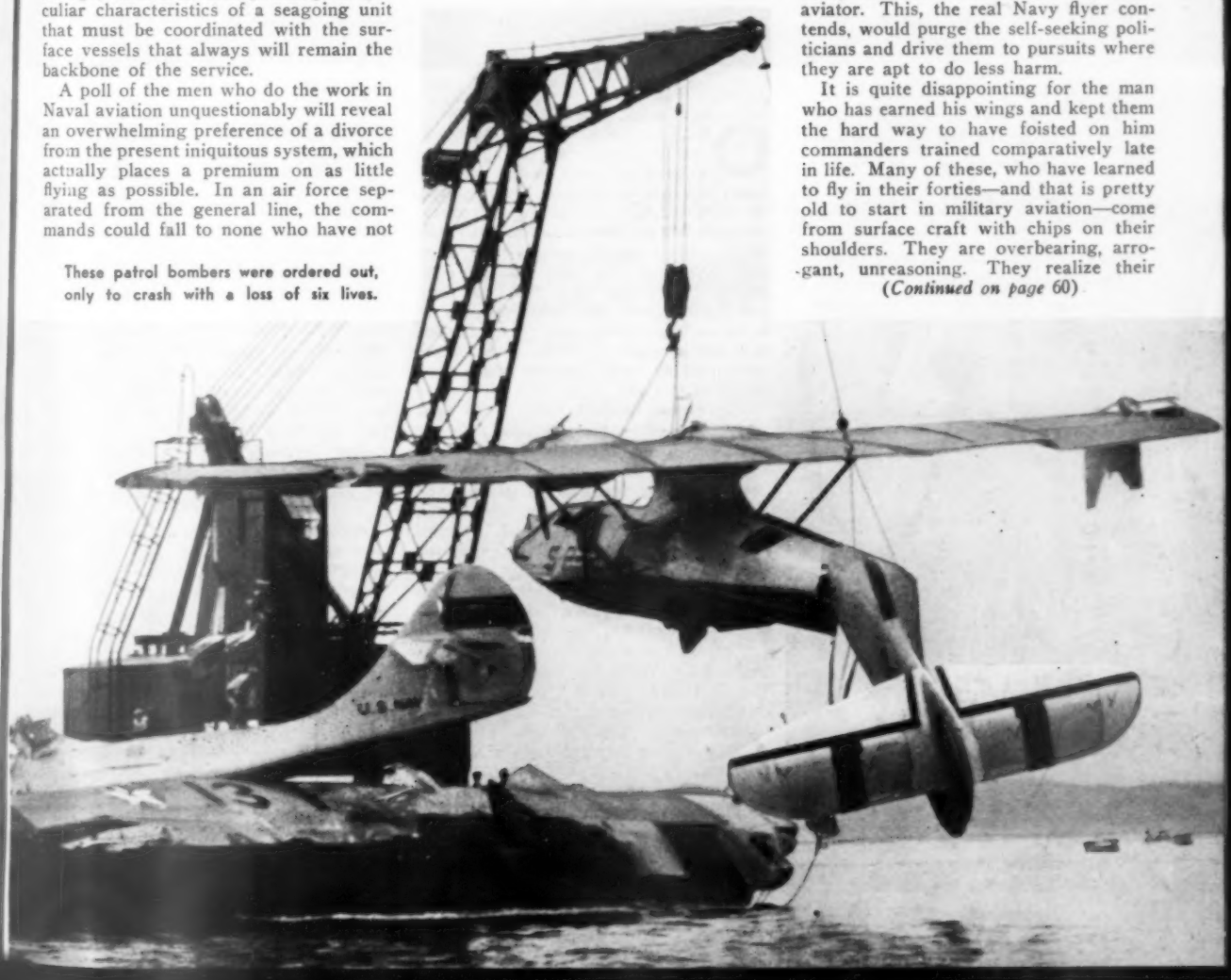
This particular officer enjoyed seven consecutive years during which virtually all his flying was done in slow, obsolete ships. He was on the Battle Force staff, went to the Naval War College, continued across the Atlantic to Paris where he was attaché in the American embassy, then returned to this country as executive officer of an aircraft carrier. In that seven years, aviation made great strides, but you couldn't prove it by him. Yet he was being groomed for the most important jobs in the air force. Soon he will be eligible to serve as a wing commander, with the fate of five or six squadrons and 1,000 men at his finger tips. There are about 50 others exactly in this officer's position.

In such a manner do many of the men known today as veterans, dating back to the World War days progress to the high commands, with little more than elementary knowledge of the rapidly progressing and changing aviation art. Some of them have as little as 1,300 hours flight time to their credit—and they've been flying for two decades!

In a separate air force, composed solely of men who have made aviation their careers from the start and must stay in it with no easy alternate duty in the general line of the Navy available there would be no room for escapists. By sheer propinquity with flying equipment every day of his service, the Navy aviator would acquire more than a passing acquaintance with the tools of his craft. A separate air force would be a sharper striking weapon in war because every man in it would be a genuine aviator. This, the real Navy flyer contends, would purge the self-seeking politicians and drive them to pursuits where they are apt to do less harm.

It is quite disappointing for the man who has earned his wings and kept them the hard way to have foisted on him commanders trained comparatively late in life. Many of these, who have learned to fly in their forties—and that is pretty old to start in military aviation—come from surface craft with chips on their shoulders. They are overbearing, arrogant, unreasoning. They realize their

(*Continued on page 60*)



These patrol bombers were ordered out, only to crash with a loss of six lives.

AIRYX

By EDWARD H. LAWSON, Jr.

This was one of the world's largest shipments of air express. In 1938, 2,371 tons of merchandise flew on the airlines.

★

Not all air express cargoes are commonplace. These penguins made the coast-to-coast flight, were paid for by weight.

ONLY occasionally does Mr. Average American ride the airlines as a passenger and, unless his personal or business contacts are far-flung, he uses airmail service at infrequent intervals. But air express (Airyx is its code word) serves nearly everyone, in some way, every day. The more than 500 commercial planes that wing their way back and forth across the continent each 24 hours no longer carry only passengers and mail, but generally are laden with a weird assortment of "rush" bundles which must travel extra fast.

These fleet carriers bring fresh eggs and fruit across the continent, deliver newsreels while they are still news, carry style designs from drawing boards in New York to factories in Mississippi, rush transcribed programs to isolated radio transmitters and speed canceled checks from bank to bank. Eyeglasses, brief cases, cut flowers, baby chickens, insects, fruits from Mexico and South America, jewels, furs, machinery—all travel air express. Serums, false teeth, rye bread, lobsters, palm leaves, orchids—these are but a few isolated items of the thousands handled every day. A mummy out of a museum, a bottle of sea water from the ocean off Cape Cod, a lei from Hawaii, a tiny locket holding fragments of the dust of Christopher Columbus—only man's imagination limits the strange cargo of the airways.

The Caliph of Cairo, says tradition, was the first to visualize the possibilities of air express. A thousand years ago, in Egypt, he feasted on luscious cherries flown to him from an orchard 400 miles away attached, in tiny silken bags, to the legs of homing pigeons.

But it was not until September, 1927, that modern scheduled air express came into being, although before that time chartered planes had been used from time to time to carry packages and freight. The first shipment of record was a pound of bacon, sent to Calvin Coolidge by a West Coast packer. Over 5,000 other packages flew through the air in the remaining four months of the year and over 17,000 in the whole of 1928. Compare this first full year's total with the record set just ten years later when 716,889 packages, weighing 2,371 tons, traveled throughout the land on the big skyliners!

Air rates are high, although at present they are only one-third what they were in 1927. A five-pound package, sent from New York City to Chicago, costs $1.92; the same flown from coast to coast would set the shipper back about five dollars. But in a big emergency, cost doesn't mean a thing. A key machine in an industrial plant goes haywire; a new part must be delivered in a hurry or the plant will have to shut down. A catastrophe occurs; serums and medicine must be rushed to the victims—and newsreel shots to theatres throughout the country. A business man leaves his eyeglasses or his false teeth or his brief case in a distant city; he must have the missing item in as short a time as possible. In every case

Tons of merchandise are up in the air at this moment; candy, flowers, baby chicks, movie film and machine parts comprise some of the air cargoes flying the airways day and night. This is the story of air express.

The stagecoach once was the fastest means of transporting goods. Today, the airplane is doing the job 20 times faster.

The airplane practically revolutionized the chicken business in South America. Thousands of chicks are shipped daily.

More and more service is being instituted by air express officials. Airyx is one of the airlines' greatest money-makers.

air express more than repays its seemingly high cost.

Manufacturers have learned that there is extra profit in speedy transportation. Dealers in such super-perishables as cut flowers and out-of-season fruits have found new business opportunities in overnight cross-continent delivery. Gourmets have discovered that they can enjoy such delicacies as stone claw crabs from Bimini, dark Kona coffee from the lava slopes of the Hawaiian mountains or soft white cocoanut ice cream from the West Indies through the magic of trans-oceanic package service. Doctors have saved countless lives as a result of the speedy air delivery of an "iron lung" or an unusual surgical instrument.

The airlines, in their turn, have begun to look to packages instead of passengers as the most promising potential source of steady income. And people everywhere have learned by now to accept the wonders made possible by air express as a simple matter of reality.

The florist business has been almost revolutionized by the development of this new transport service. Today it is possible for any dealer to get orchids straight from Guatemala, lilies picked from a Bermuda garden and delivered the same day, or orange blossoms fresh from Florida. Last New Year's Eve a single shipment containing over 7,000 orchids sped across the Rockies from San Francisco to Chicago to fill an unexpected demand. A few months earlier the same flower center had sent 4,000

Many thousands of dollars have been saved manufacturers and other operators of expensive machinery by air express. Replacement parts get there quickly by airliner.

Regular aerial freight service once was tried by TWA. Obsolete airliners were used and they hauled nothing but freight. The plan was dropped because of lack of business.

During the recent New England hurricane and floods, air express proved invaluable in rushing food, serum and medical supplies to stricken areas. Above, a load of serum.

blossoms of Madagascar jasmine to be used as decorations at the Roosevelt-DuPont wedding in Wilmington. A St. Louis florist specializes in securing leis from Hawaii by Clipper and delivering them in 36 hours to any point in the United States. An embarrassing situation at the New York World's Fair was cleared up recently when a group of dancing girls, who claimed they couldn't do the hula because they did not have the proper costumes, were furnished ti and palm leaves rushed from their native land, packed in ice to keep them fresh and supple.

Style items rival perishables as a standby of the airlines. A store in California invests several thousand dollars in a consignment of Paris models. Unless it can get them on sale before the inevitable cheap imitations are displayed, it may lose everything. Air express furnishes the solution by delivering them in time to be displayed less than 20 hours after they leave the boat at New York. Conversely, creations worn by Hollywood stars at important premieres have been sped to New York and displayed in Fifth Avenue shop windows the next morning. Same-day and overnight cross-country deliveries have changed buying and selling methods in the clothing business tremendously, permitting decreased inventories and placing stores in remote towns on an equal footing with those in larger cities in the matter of showing up-to-the-minute styles. Nearly all the big department stores will now make air express delivery of dresses to customers several hundred miles away. Recently a Palm Beach store ordered 60 gowns rushed down from New York, from which a customer selected one to wear next evening. And several women in New York make a lucrative business of shopping on Fifth Avenue for persons in small towns and delivering their orders extra-promptly through the air.

Foods also ride the airlines regularly. Shrimp from New Orleans, potatoes from Idaho, fresh green peas from California, oranges and grapefruit from Florida, coffee from Venezuela—these are but a few of the many items shipped each day. The wife of the director of a hospital at San Pedro de Marconis, in the Dominican Republic, has a standing order with a New York bakery for two six-pound loaves of rye bread every other week. The bread leaves New York Wednesday morning and she can serve it at lunch Thursday. A swank New York night club features on its menu luscious melons cut from the vine at Electra, California, the morning of the day that they are served. Another serves white cocoanut ice cream made in the West Indies from pure milk, frozen in half an orange peel. Many smart hotels boast of their stone claw crabs imported by air from Bimini, or of their guavas and papaya melons flown from Florida or Texas. One Atlanta, Georgia, restaurant makes a specialty of serving lobsters caught off the rocky coast of St. Ann, Massachusetts, sent by rail to Gloucester and flown the remainder of the way in half a day.

Other shipments that move back and

(*Continued on page* 86)

Ensign Winston is a former New York newspaperman who took up flying as a career.

By
ROBERT A. WINSTON
Flight Instructor, Naval Air Station, Pensacola, Fla.

One careless moment before the take-off and a Naval airman finds himself facing a perilous crisis.

I Learned About Flying From That! – No. 5

WHEN things start to happen in the air they usually happen fast. If you break the law of gravity, you can't go around and get the ticket fixed; you pay the penalty right then and there, according to the degree of your violation. Of course a few variables like altitude, terrain and luck may mitigate the circumstances, but the chances are that when the emergency comes, you're going to be pressed for time.

"Never take off in a hurry. Be sure you're all set before you leave the ground! Always try to anticipate the emergency and you'll know what to do when it happens!" For years I'd had these elementary life-saving rules drilled into me by Navy flight instructors, squadron gunnery officers and section leaders, and for the past year I'd been drilling them into student Naval aviators as a flight instructor. So there's no excuse for the close call that was the result of violating these vital rules—a near-accident that would have spoiled a hospitable southern city's splendid safety record for their annual aviation meet.

The ninth annual National Air Carnival, June 3rd, 1939! Birmingham, Alabama, wealthy metal metropolis of the south, a picture city nestling in a green valley framed by wooded mountains, with Vulcan's statue standing guard on the topmost crest. Real hospitality in the south's finest tradition, with the keys to the city for visiting airmen. That was what we found awaiting us as we left Pensacola, detoured around a few rain squalls and brought our two sections down on Birmingham's excellent airport.

We had three Grumman single-seat fighters and three North American trainers, two-place low-wing monoplanes. These planes were to be on exhibition at the airport, but were not to take an active part in the air carnival due to an understanding with the Army, who had a National Guard unit on the program. "We'll stake the planes down," our Skipper told us, "and they won't leave the ground until we're ready to take-off for home. Those are our orders from the Navy Department. For once we'll be able to see some air races from the spectator's point of view!"

That was all right with the rest of us, but we hadn't counted on Birmingham's hospitality. They deluged us with cocktail parties, banquets and dances. They swamped us with more invitations than we could have accepted in a month. And everywhere we went, the question was the same: "What kind of a show is the Navy putting on this year?"

After accepting so much hospitality, it was embarrassing to have to reply: "Oh, we're not taking part in the carnival this year. We just came up to watch."

At first this was taken to be a joke, for the newspapers were full of the usual flowery publicity and the committee had already assigned us a place on the program. But as the first day's events drew to a close and our planes still sat on the ground, incredulity changed to astonishment and astonishment to indignation. The committee grew wrathful. *Why* couldn't the Navy participate? After all, it was their Navy! Were we willing? Of course! Did the Army object? Not at all. "Then we'll see about that!" they said. "We'll wire Washington! We'll telephone the Navy Department! If necessary, we'll call the President!"

The day passed and the night wore on, but still no permission was forthcoming. Then the committee really went on the warpath. Congressmen were kept on the telephone and senators were gotten out of bed. But midnight came and still our orders were to stay on the ground until we left for home. At the Air Carnival

(*Continued on page 66*)

Regulation Changes

SUGGESTED changes in the Civil Air Regulations to provide the aviation industry with an incentive for the development and use of aircraft inherently safer and easier to operate than conventional type airplanes now in general service, were made public recently by the Civil Aeronautics Authority and will be sent to aircraft manufacturers for constructive criticism. This move marked the first step ever taken by a governmental agency supervising flying activities to put a tangible premium on built-in safety in aircraft.

Tentative performance characteristics which an airplane would have to meet to qualify for the Authority's proposed built-in safety requirements are listed below. Several manufacturers maintain that planes capable of doing this already exist; numerous others have assured the Authority that it is entirely possible to build ships meeting these specifications:

Landing and Taxiing:

1. The airplane shall be capable of being landed easily at any speed between the minimum and at least twice the minimum, and shall tend to remain on the ground after contact.
2. Full application of brakes up to the point of skidding the tires throughout the entire landing run shall be possible with no danger of nosing over.
3. The landing gear shall be stable in taxiing and entirely free from ground looping tendencies. The airplane shall be easily steerable.
4. The airplane shall be capable of being landed over a 50 foot obstacle in a straight glide with no wind and brought to a stop within a horizontal distance of 500 feet.
5. The landing gear shall be capable of satisfactorily withstanding:
   a. Landings having a vertical component of the velocity of 15 feet per second, and
   b. Straight glides to the ground in still air with the elevator control full back, without overstressing any part of the airplane.
6. The airplane shall be easy to taxi in any direction and under complete control in winds up to 30 m.p.h.

Controllability and Stability:

1. In steady flight with the elevator control full back, the stabilizer in the most tail heavy adjustment, the airplane under the most tail heavy legitimate loading condition, and with any engine throttle setting
   a. The lateral stability shall be such that a positive damping against rolling will counteract any tendency to fall off on a wing or enter the initial stages of a spin, and
   b. The airplane shall be fully controllable laterally.
2. The airplane shall be impossible to spin under any loading or power condition, and regardless of the

(*Continued on page* 87)

Sodium Lights for Landings

REVOLUTIONARY changes have been made in the lighting of airport runways due, largely, to the necessity for airlines to operate in weather of limited visibility. With the approach of instrument landings on scheduled airlines, the Westinghouse Electric and Manufacturing Company has perfected a new lighting system of vari-colored lamps whereby the airline pilot can contact and identify his position over the runway at a glance. The design of the new system provides three green incandescent lights flush with the ground. These merely indicate the beginning of the runway. Then, at 100-foot intervals, the new sodium lamps (see inset) appear. The final 3,000 feet of the runway is marked by white incandescent lights and, at the far end, are three more green lights. Five "test" airports have been used.

Vega Makes First Flight

THE photograph below was taken on completion of the first test flight of the Vega *Starliner*, novel "feeder" airliner developed by a subsidiary of the Lockheed Aircraft Corporation. Most unusual feature of this ship is its "two-in-one" Menasco *Unitwin* engine which actually is two 260 h.p. inline engines built together to turn the single propeller. Mid-Continent Airlines has purchased the first ship.

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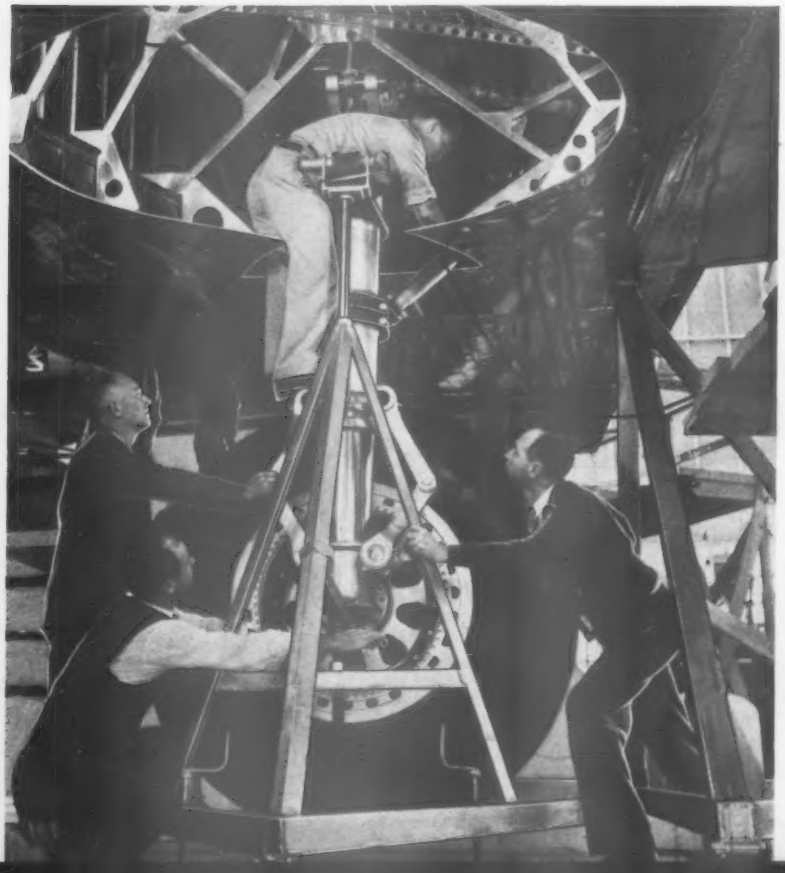
FLYING MILITIA

Hanging just above the radio aerial of the cameraplane, this Illinois National Guard O-47A poses for its portrait.

PLANE LABORATORY

by FRANK CUNNINGHAM

Nothing is left to guesswork these days. Aeronautical engineers are running their tests up in the sky—where tests are most conclusive.



The DC-4's giant wheels were thoroughly tested under actual flight conditions.

HISTORY records that from nearly 500 years before the birth of Christ man has not only dreamed but written of flying. We knew that the sight of birds winging must have caused earliest man to have the queer feeling that, if the soaring birds could fly, he could too. Yet, there still is one unsolved problem that has been the goal of aviation since humanity's dawn. That goal is, *always to walk away from a landing.*

This sounds simple enough, but when one considers the story of aerial progress from the early days of the 18th century when Sir George Cayley experimented with gliders and John Stringfellow built the first successful flying model that went about as far as a good football back on an end run—around 40 yards—the eternal quest has been "On spreading your wings for a loftier flight, the moral is take care how you light."

High ranking men of the modern aeronautical world, on whose shoulders rests the responsibility that pilots and passengers walk and are not carried from landings, are many in all organizations. Essentially every man is concerned with this duty, but to one or two men in many aviation companies there is the assignment to bring back "the news from the clouds." Such a man is Al Reed, flight test engineer for the Douglas aircraft company, in Santa Monica, Calif.

Slim, youthful Reed who, 10 years ago got his B.S. degree from Caltech, is frank to admit "so many things about airplane operations are to be learned that we're quite busy." Busy as he was,

Reed took time to tell this writer of the development of the test and research units in the aviation industry. A growth that has taken the test department—the classroom of aviation—into the clouds. The laboratories have sprouted wings and flown!

"A comparatively few years ago," Reed said, "a test pilot took a plane up to see merely if it would fly. If it flew well, or sometimes even just flew, that was all. If she didn't fly, well . . . !

"In those days commercial companies had little in the way of test equipment on the craft. The brains of the engineering department molded canvas and wood that would perform perfectly—on paper. And, even if the planes did maneuver correctly at the factory field, there were no tests to determine how they would do under various weather conditions. The builder's motto was 'Let the buyer beware!' "

"Is that what brought about more rigid testing?" I queried.

"It is," Reed replied as he toyed with a pencil. "The Army and Navy and commercial operators turned against the practice of the manufacturer's idea that the main thing in a plane was its ability to stay together in the air under favorable conditions. They wanted ships tested under actual operation problems. They wanted to know what the plane would do in a snow storm; what it would do when a gale tore at the ship's wings and lightning crackled about the pilot's head. They demanded to know how geographical conditions would affect the ship's performance."

"And they got the answers," I commented cautiously.

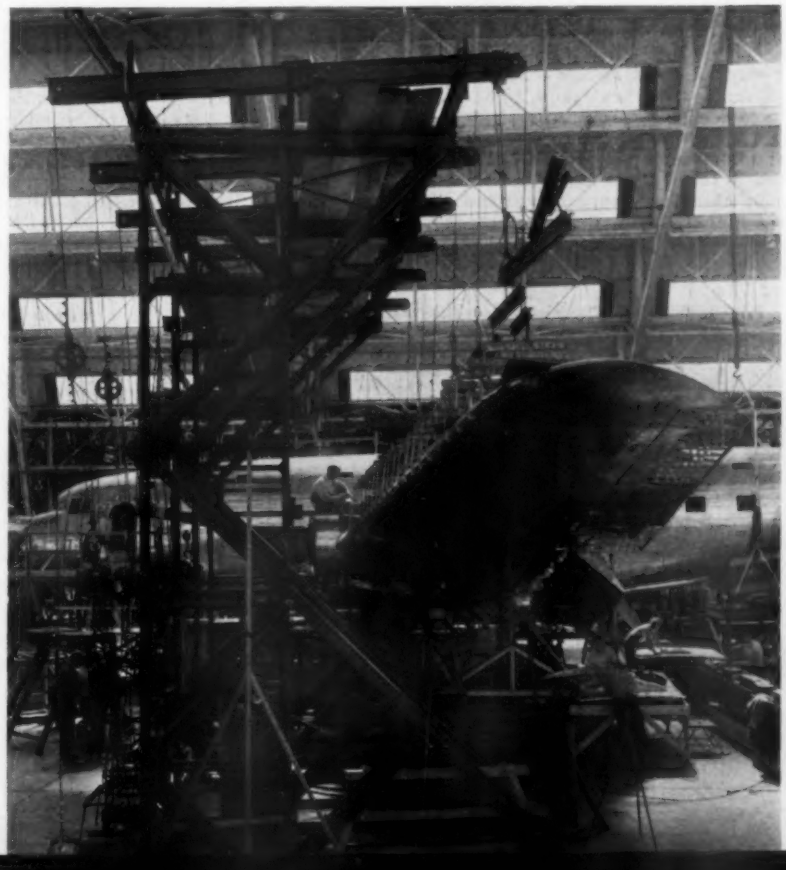
"They certainly did," was the reply. "The engineers ran laboratory tests on the ground to try to duplicate conditions that an aircraft would face. Then the research men went aloft themselves and one of the most far reaching steps in testing was taken."

When one posts a letter marked AIRMAIL he doesn't realize that the development of the airmail service was one of the major factors in assuring as safe as possible planes. For the first time schedules had to be met, machines had to be flown in all types of weather and pilots had to have some assurance that not only the mail but live pilots would go through. It was in the middle 1920's, Reed declared, that the Fokkers, the early Fords and a few Douglas ships were tested in an effort to meet the requirements demanded of aircraft by old man weather leagued with advancements in design and potential plane performance.

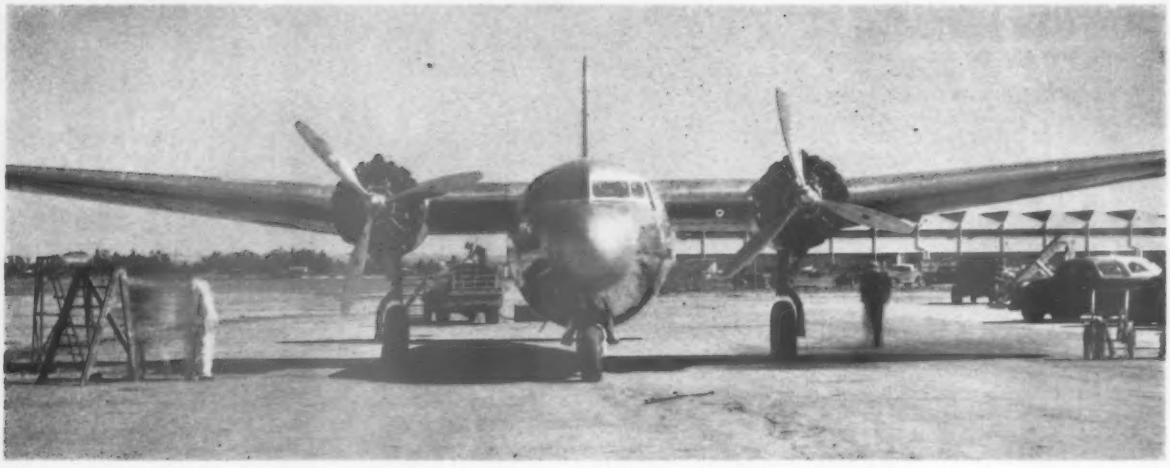
Despite the fact that around 1921 the Army and Navy had outstripped the commercial companies in testing planes and actually took simple laboratory equipment up in the air, it was not until 1933 that testing began on a truly comprehensive scale with many factories.

Today all the major companies have moved their test departments skyward

The aeronautical laboratory literally has taken wings. This is one of the many instrument panels that went aloft in the DC-4 during exhaustive flight tests. Not only was all data carefully checked; automatic cameras photographed instruments.



After exacting ground tests on the DC-4 wing, thorough flight tests were made.



The latest Douglas—the DC-5—has been undergoing exhaustive flight tests for several months. When these tests are finished, the DC-5 will have flown through every condition it ever will have to.

in an effort to find the new objectives in airplane stamina. That is, stamina combined with safety. Testing is more than having a Hollywood-type pilot try to tear the wings off a plane in a dive so that the little gal with the big blue eyes won't have to marry the no-good son of a domineering big-shot. Testing today is a scientific study of a plane's reactions to nature's forces. It has been coldly reduced to laws of mathematics and science, but it is still a thrilling job of keeping air-minded folk air-minded.

Flight testing at Douglas started with the DC-1. This was especially necessary on this model because the ship originated a certain type of metal composition, a series of steel cells for wing construction. From then on actual air testing became a part of a plane's early life. Today the sky classroom is an important phase of most new ships. The classroom has lots of classmates. Twenty-five men were on many of the 74 test flights made on the DC-4 which totaled nearly 120 hours in the air and in which more than *one thousand* individual tests were made. Day and night the research men punished the 65,000 pound craft in an effort to find a weakness.

"Just what takes place when a ship is tested?" I asked Reed. The Chicago-born man who, for a short time taught at the University of Minnesota, took a long sigh that was punctuated by the rumble of the huge drop hammers on the first floor below us.

He smiled, spoke, "If you don't want to write a text book length story on testing, we'd just better give the ground testing a brief comment and let it go at that. After engineering plans have been okayed, a model of the plane is constructed to scale. Balance, control and stability are checked in a wind tunnel. When the craft itself is under construction all parts are checked for maximum loads. In many cases we try to put three times the anticipated highest pound load on the ship. Loads and pressures are simulated most times by pig lead bars weighing 55 pounds each, extreme pressures are applied hydraulically. The engine is placed in a test stand and sometimes put in other airplanes and examined. The rest of the parts from the propeller to the brake are gone over carefully.

"Testing isn't inexpensive. First class equipment for checking on a landing yoke costs over $8,000. Because of the thousands of dollars involved, as a rule smaller companies are handicapped and must use more or less standard and proved equipment so as to avoid excessive cost or else overly risk crashing test planes in the large ship field. A year's testing on the DC-4 cost about $100 000 a month!

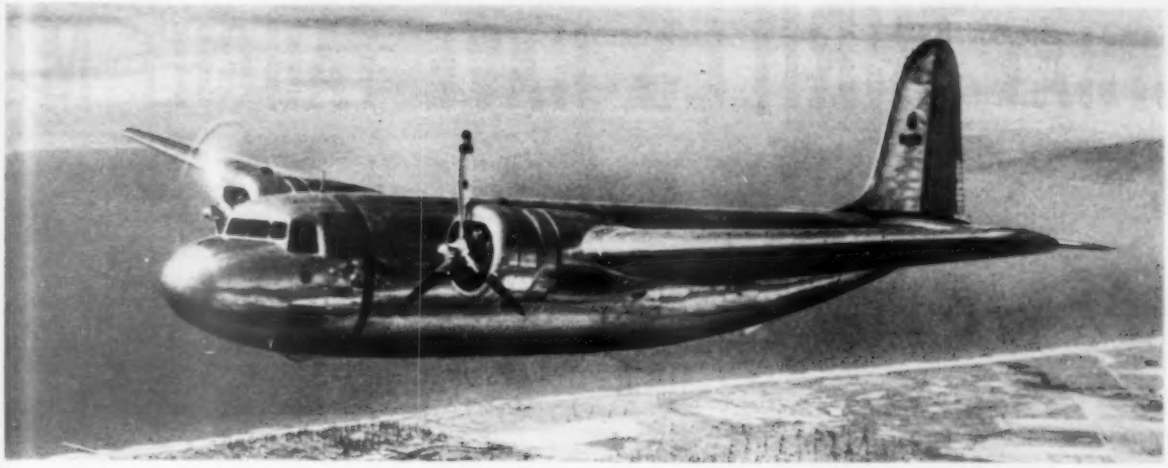
"Now to get back to the test, we have the plane ready for its flight checks. You will recall I mentioned here it was that the research men, aided by many universities, have made their greatest advancement. With a new ship we give a series of tests which are divided into stability, control, performance under maximum conditions of load, pressures vibration, night flights and commercial performance.

"First we taxi the plane. These tests are essential to check brakes and elevators as well as the landing gear. After we are satisfied with the initial test we do a number of runs into the wind to examine the take-off elevator control. Now what do you think is next?"

Can you imagine—asking *me* questions. That's putting things in reverse. Anyway I had the answer and it was a

For load flight tests these bars of lead are packed aboard in positions similar to those taken by passengers and cargo.

Here is a new airliner being subject to simulated stresses which later will be compared to data obtained in flight.



Engineers designed the DC-5 for safe single-engine flight when fully loaded, but company pilots have to try it before they'll believe it. The DC-5 soon is to go into production to fill several airline orders.

right one. After that the test engineers fly the ship to get her response to the pilot's control and her stability. Also as each ship is an individual unit her flying characteristics are checked.

From then on numerous tests proceed, but not in any given division as this would not be practical. All the units enumerated by Reed are covered; however, not in sequence but as opportunities for tests present themselves.

Reed opened a drawer in his desk, pulled out a paper. "I'll read you what we learned on a DC-4 flight test," he spoke. "The full power maximum rate of climb check from sea level to service ceiling was not only used to obtain performance data on the airplane, but also to check the flight power plant operation and cooling, the auxiliary power plant operation and cooling, the power output of the engines at all altitudes as compared with the design calculations—and level speeds of the airplane at various powers at a series of altitudes during the descent after completion of the climb."

Now let's look at the stability and stall tests a ship undergoes before the CAA says "okay, buddy." The research engineers' problem is to find the characteristic stalls by actually stalling the ship under all power conditions and combinations of landing gear and wing flaps. For this test the machines are dressed in a series of fragmentary "knitting balls." Six inch pieces of black yarn, one foot apart, are attached at one end to the upper surfaces of the wings. When the plane is in flight observation of these pieces of yarn indicates the stall situation over the wing. Motion pictures are made with a high speed camera. As a matter of record, as many of the air tests as possible are photographed with a movie camera. Films of the instruments readings are also made. Plus this, the engineers' on-the-spot verbal remarks are taken down by dictaphones.

In a large plane the longitudinal stability tests are comparatively simple. The problem of getting a series of gravity locations can be controlled by having the crew members move about the ship and thus shift the center of weight. Think of a crew of 25 men running around a ship in flight in the old days!

While we're mentioning the flow of crew members back and forth let's note the test for determining the air flow for the cooling of the power plant and, at the same time, to find the outside air pressure at various points on a pressurized cabin. To find the answer valve banks are placed over the ship so that the engineer has as many as sixty pressure lines by which he can read the load at various points on the plane's surface. The pressure is read on a single gage connected with the lines.

The flight control response test is important as in it the dangerous positions for the plane and its controls are observed by the modern Merlins. Here the critical moments for the rudder, elevators and ailerons are found. Every possible combination is tried. Even those setups of dead engines, speed and simulated weather conditions which are almost impossible by chance to duplicate. Aviation has to be prepared for the impossible.

"Vibration is still one of the problems we haven't conquered," Reed continued, "vibration of the whole airplane and particularly with the study of the vibration of the propeller in flight. Along with the flutter of wings, ailerons, rudders, with regards to the stalling surface, it is

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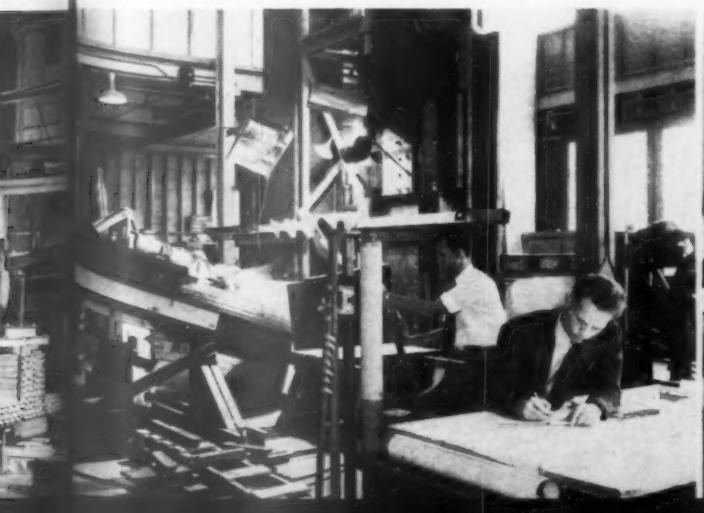
Here is an airliner's landing gear being tested to destruction. A camera above it photographs each test phase.



Once in the air elaborate and minute tests are run all over again. Here are engineers at recording switchboards in DC-4.

WHAT THRILLS HAVE TAUGHT ME

By TEX RANKIN

It's one thing to get caught in a tight spot but it's another to be able to profit from a near-accident. Presenting some more of those invaluable Rankinisms.

★

GOOD, substantial scares—the kind that make your hair stand up a little and ice go up and down your spine—are valuable. In my case, one of my early thrills was one of my greatest and resulted in the career I have followed to this day.

I came to Portland, Oregon, in the spring of 1922, from Walla Walla, Washington, where I had conducted a flying school for two years, to take delivery on an OX-5 Jenny. It was necessary to assemble it and, for this purpose, I engaged the services of a mechanic, Danny Grecco, who knew his airplanes then—and does now. Danny and I worked like Trojans.

In those days it was an unwritten law that the mechanic who had done the job always flew with the pilot on the test hop. This rather questionable display of judgment was an idea that developed during the World War. The mechanic backed his guarantee of a safe job with his life.

The pilot, too, seemed to have swung into the spirit of the thing after the close of the war. He always put the ship through an aerobatic routine on the test hop just as a sort of guarantee to his potential cash customers that the old crate wouldn't fall to pieces. Many good pilots lost their lives in this manner.

Danny and I could hardly wait until the last turnbuckle was safetied and the Curtiss OX-5 engine warmed up. At last everything was in readiness. We climbed aboard, fastened our belts and taxied out to the far end of the airport.

Feeling very happy about the shiny new job, I took off, nosed up to 4,000 feet and, after a few exploratory maneuvers decided on a loop. In a recent article in this magazine, I explained what I had learned about the effect of centrifugal force on an airplane, and how it increased the wing-loading. But in 1922 I knew nothing concerning those facts.

Of course, the old Jenny didn't have enough power to loop from level flight so I shoved the nose down, opened the throttle wide, and gathered considerable momentum. Then, feeling that sufficient speed had been attained, I pulled the stick back and started around. I got to the top in the inverted position and mushed up and away from the loop. This proved that I had too much speed and that centrifugal force was carrying me out of the normal arc. The ship fell off awkwardly into a normal spin.

"You need more speed!" yelled Danny, when we had recovered.

"Perhaps you're right!" I shouted back.

I dived mightily this time, made my half loop and then, when I reached the inverted position with even more speed, the ship broke out of the circle into a snap roll. Years later I understood that it was due to the increased wing-loading caused by centrifugal force.

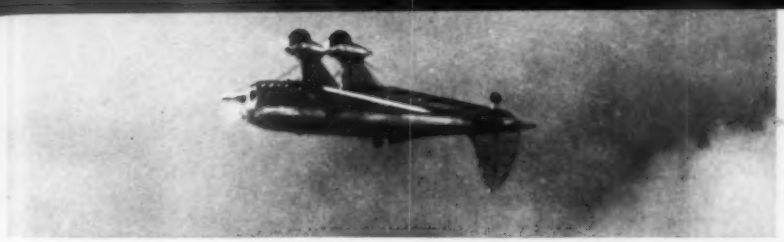
Instantly, I was frightened. The ship was doing something I hadn't expected it to do. In fact, I didn't know what it was doing. Automatically, however, I obeyed a rule pounded into me since my first flight lesson—"When in doubt, put the nose down."

Forgetting that I was upside down, I pushed the stick ahead to accomplish this purpose. Then the fun really started, for the ship went into what I learned later was an outside spin. It was strange and terrifying. Danny and I were slapped around violently in our cockpits. This made me even more panic-stricken. I pushed the stick ahead further and further to get the nose down. The more I advanced the stick the more violent the spin became. We hurtled downward, ever downward, with the world whirling sickeningly.

We were close to a thousand feet when,

The author relates some experiences to T. C. Ryan, famed aircraft manufacturer.

This is the kind of a thrill a pilot should seek only when he's had plenty of experience at this sort of thing. One of aviation's deadliest mistakes is low flying.



A good progressive pilot should try every maneuver his plane can do safely. The author spent much time flying inverted, learned many things few pilots knew about.

from somewhere in the back of my mind, locked there since the days of the war, came the words of a French instructor I had known in France:

"You can revert to an inside spin from *any* position by pulling the stick back and applying rudder."

I did that. The "outside" spin went "inside". All was right with the world as I recovered level flight at between 300 and 400 feet. Possibly it was less. Perhaps, today, a normal inside spin may be a frightening sensation to you. It may even do things to the inside of your stomach. To me, at less than a thousand feet, it was one of the most welcome events of my life.

Incidentally, as advice to you—if you know Danny Grecco, don't ask him to fly with you on the test hop after he does a job of rigging your ship.

When I got my feet on good old Mother Earth again, I realized that I knew very little about aerobatics. I resolved that never again would any ship that I was flying get into a position from which I might not understand how to recover.

I went to work immediately. First I drew out all the maneuvers I wanted to try on a blackboard. Next, I studied them carefully for several days. Finally, I went aloft and practiced each one until it was perfected. Then I proceeded to the next. Eventually, I discovered that I really enjoyed aerobatics. From there on it's been great sport.

But one thrill doesn't teach you everything. Witness again the writer taking part in an air meet seven years later in Walla Walla, Washington—on the old fort grounds west of the city. The air-minded in the vicinity know the set-up there. First comes the field, then a grove of locust trees and then the Union Pacific station. This geography figures intimately in the events of the day.

Also the late Basil Russell. The contest for the aerobatics championship had been a hotly contested affair among several pilots. The judges had gone into a huddle and had announced that Russell and I both had done an extra good job. So parallel had been our stunts, and so evenly executed, that the final decision was that we were tied for first place. They decided that we settle the matter of first and second prize by each of us making another flight. They stated that if either of us was able to do one maneuver that the other would not, or could not duplicate, that one would win first prize and the other second.

Russell decided to be off first. As I remember, he was flying an OX-5 Travel Air, and I was burning up the airways with an OX-5 Waco "9"—the job with the spreader bar undercarriage, to add another necessary point.

Russell did just one stunt.

Secretly he had been practicing an Immelmann. True Immelmanns were a maneuver pilots knew little about. They were usually attempted so high that spectators had only a faint idea of what they were. And there were but few pilots who had mastered this difficult maneuver although it was originated during the World War by the German ace whose name it bears. With the ships of today it is one of our easiest maneuvers.

Russell got a few hundred feet off the ground, dived until he cut the grass with his wheels, and then pulled the stick back. As he went up and over on his back the people in the stands thought he was going to try to complete a loop and were sure that he'd be killed. But at the top he executed one half of an outside snap roll, making a perfect Immelmann. He throttled down and came in, landing conventionally.

I knew, when I heard the reception he

After drawing new maneuvers on a blackboard, Rankin then went up and tried them.

Nothing requires cool thinking like a sudden, unexpected maneuver near earth.

This pilot got an unexpected thrill while trying to land food inside a strike-bound steel mill several months ago. The ship stalled unexpectedly and crashed into a train.

got, that I was going to have a hard time equalling him. But I had also discovered Immelmann's method. So I went up several hundred feet, dived to a very low altitude, and duplicated his maneuver. But I was harboring an added touch. If I could make a spectacular stunt out of my landing, I'd get the first prize and all would be well, So, my maneuver completed, I flew back over the west end of the airport, headed east in the direction of the locust trees in a wide-open dive. When I neared the row of trees, flying only a few feet above the ground, I zoomed straight upward about seven hundred feet. My idea was to slide off on one wing, make a violent slip to within a few feet of the ground, then straighten out and level off for the landing. But my enthusiasm got the best of me. I hung there too long. The ship slowed down beyond the point of control, fell out of the stall into a spin. There I was, just a few hundred feet over the locust trees in a spin from which recovery seemed rather doubtful for the moment.

I fought desperately to get control. I figured that if I could recover from the spin I might possibly get the nose up in time to hit the trees flat and at least avoid a more serious crack-up. I knew that if the ship struck nose first it would indeed be serious.

Old Man Luck stepped into the situation. He was twins. First of all, I got the ship out of the spin. Second, it came out heading toward the airport and not toward the Union Pacific station. I was now diving straight downward, heading for the locust trees. I hauled the stick back quickly and the cross bar of the undercarriage took out the top of a locust tree. The ship struck the surface of the airport about 50 feet from the row of trees, bounced high a couple of times and then settled down. A lot of things were bent and sprung but nothing was damaged seriously. I turned off the switch and just sat there, too weak to move. And was my face red? I felt like a boy caught stealing his mother's prize jam. I told myself how stupid I was to have attempted such an asinine thing. How could I ever face my fellow-pilots again after pulling such a dumb stunt?

A car rushed over. Russell and the judges climbed out. Russell said:

"You win first, Tex. I won't do a tailspin landing."

Well, that sort of relieved the tension and I had a good laugh. We pooled the money for first and second and split it. We tossed a coin for the cup and I won it.

That, one of the thrilling milestones, taught me plenty. The first was to stay up in the 4,000 foot level until I had my stunts perfected. I saw that trying a new stunt close to the ground was virtual suicide. I was grateful that I had found it out with such small damage to my plane and with no damage to myself. Another lesson I got from it was never to approach a stall close to the ground. In all the maneuvers I now do close to the ground I fly at very high speed. I do only maneuvers which do not cause me to lose control of the ship and only such maneuvers I have practiced at high altitudes for many weeks. Never any snap rolls, spins or stalls at low altitudes is my motto—and I stick to it.

Another thrill that just about wrote a textbook for me occurred almost four years ago when I was making a national tour demonstrating a popular make of low-wing monoplane. I had been all around the country when I received a call to go to a field about 20 miles outside of Detroit, Michigan. I landed there, found a great deal of enthusiasm. There were many students and several prospective buyers.

I first gave a demonstration of what the plane could do and then issued an invitation to all those interested to hop the ship. Several pilots went up and all seemed to like the performance. Then I turned to one of the partners who operated the field.

"Now it's your turn," I said.

"Swell," he answered, "only I'm not going solo. You come along."

I tried to tell him he'd get a lot of kick out of soloing, but for some strange reason he wouldn't listen to me. So I climbed into the front cockpit, he got into the back and we taxied out to take off into the wind. I knew that he was an excellent pilot. However, as he took off the ship started a climbing turn, shooting over some densely wooded land near the end of the runway.

"He's trying to scare me," I thought. "I'll ignore it."

I settled back to enjoy myself. It was a swell day—one of those warm, clear summer afternoons you get now and then. But I soon began to notice that my friend was flying odd'y. Instead of feeling the ship out with a series of maneuvers he was continuing to climb in the spiral he had started. I checked the controls and found he was stiff on them. I looked at the altimeter and discovered that we had 3,000 feet.

Finally, mystified, I pointed to my head, indicating that I wanted the controls. I got them, all right. They were frozen. I began to think that maybe something had happened to my friend. Perhaps he was ill, or dizzy, or paralyzed. I prepared a nice, reassuring smile and turned around to nod to him that everything was all right and to indicate that he didn't have to hang onto the controls like that.

I found myself looking at a man who, in turn, was staring into the jaws of death. His face was ashen white, his mouth was open and his eyes were as big as dollars. He gestured feebly for me to look behind him. I did—and turned 17 times whiter than a sheet and felt one hundred times worse than he did.

The rudder was gone! No. I looked closer. It had fallen on its side and was resting on the left elevator and the streamlined metal piece attached to it was underneath the right elevator. The left elevator could not be raised and the right elevator could not be lowered. We were really in a mess. Oh, for two parachutes!

The ship continued to climb. The only available controls were the ailerons. The ship became a flying laboratory. It was still climbing. We began playing with the flaps and throttle. We found that by lowering the flaps we could get the nose down. We checked and re-checked the flaps to see how the ship would perform, alternately raising and lowering the nose. I began feeling out the ailerons and found that even with the rudder gone, if I raised the nose slightly and used the ailerons, I could turn.

My friend was handling the flap con-

(*Continued on page* 88)

A split second after this photograph was made the airplane flew into the ground and was wrecked. The pilot was trying a dangerous stunt with which he wasn't thoroughly familiar. He was slightly hurt.

Youngstown Shows Them How

by GEORGE R. REISS

Twenty air-minded young business men can't sit around idle very long. This group bought an airplane and have done so well their friends are about to try it.

J. Ralph Seidner is the young professional pilot who rules over the Youngstown club. He has done so well a second plane has been purchased for members.

THIS is the story of how a group of young men licked the HCOF—high cost of flying, to you—which is a very real problem to many modern young men. It is the story of how this same group of young men, miraculously enough, made a very unair-minded city completely and enthusiastically air-minded within a few short months.

It is also the story of the very small beginning of a movement that is "mushrooming" and "snowballing" into something that promises to initiate a new era in aviation, something that perhaps some day will rival in importance the Civil Aeronautics Authority's pilot-training program—and without a cent of cost to Uncle Sam.

It is also the story of how a flying service operator, with much spare time on his hands because of the high cost of flying, turned some of that spare time into a profitable sideline to his business, a lesson to any flying service operator.

In still other words, it is the story of the Youngstown, Ohio, Junior Chamber of Commerce Flying Club, one of the most spectacularly successful of flying clubs in the United States. So spectacularly successful is it, in fact, that the Youngstown Junior Chamber has been forced to organize its second flying club to take care of the overflow of members clamoring for flight training. Already, a second airplane has been purchased and Junior Chambers—those bodies of alert, civic-minded young men—the country over, are demanding information on the secret of its success, planning to organize a chain of similar clubs from coast to coast.

It is composed of the type of men Uncle Sam is so anxious to get into the air — so anxious, indeed, that he is spending nearly $10,000,000 a year in the CAA pilot-training program. They are intelligent, energetic, alert young men, chiefly professional and business men, with college educations, eager and ready to pay their own ways.

They are chiefly young lawyers, doctors, engineers, junior factory executives and business men; none with the idea in mind of becoming professional pilots—for most of them already have assured futures—but merely wishing to learn to fly for the sport of it, for the relaxation and recreation that it affords.

The whole movement started recently with J. Ralph Seidner, Jr., and Wendell C. Eckert, members of the Youngstown Junior Chamber of Commerce. Seidner is a 25-year-old professional pilot, operator of a successful charter service and flying school. Eckert is an insurance salesman, a private pilot and chairman of the aviation committee.

Seidner's business—like that of so many other flying services—was hit hard by the winter weather, leaving him plenty of spare time and he gave serious thought to ways and means of drumming up new business.

Repeatedly he solicited members of the chamber to learn to fly—and repeatedly he got the almost universal answer:

"I'd like to learn to fly—but I don't

(*Continued on page 62*)

Age Limit Raised

THE Civil Aeronautics Authority, as a safety measure, has by regulation raised the age at which private pilots may be licensed from 16 to 18 years, the age required for students under the Authority's plan for training 15,000 pilots annually. The new regulation does not, however raise the age—16—at which student pilot permits may be issued. The effect of the change, therefore, will not be to prevent otherwise qualified youths of sixteen from beginning training, but will prevent them from carrying passengers, as private pilots can.

In recommending the change, Oswald Ryan, member of the Authority, wrote: "The Authority cannot be too careful, in my opinion, in making certain that those pilots who are privileged to carry passengers are possessed of mature judgment and have the proper mental attitude toward the operation of aircraft. While there may be a few exceptional cases in which boys of 16 years of age are sufficiently mature to be entrusted with the lives of passengers in an aircraft, many such boys are apt to be deficient in judgment, if experience with automobiles is any criterion."

Fuel in Mid-Air

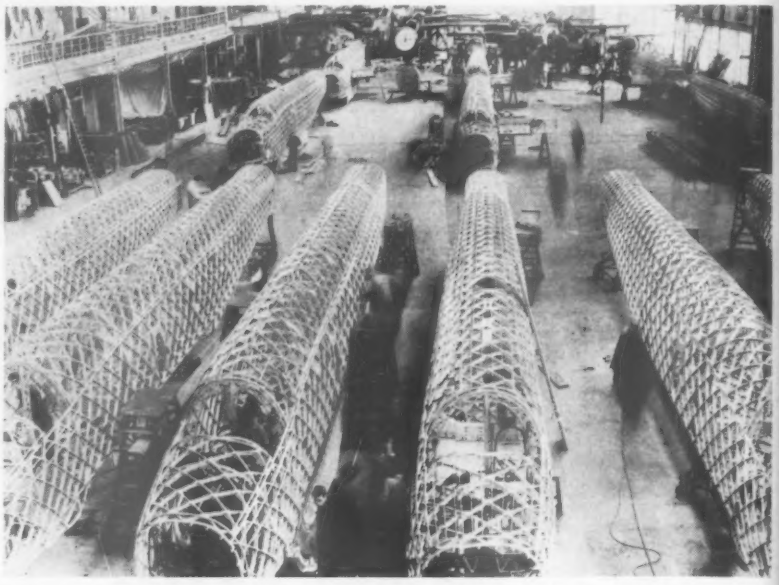
THE flying boats of Britain's Imperial Airways which will be utilized for the transatlantic service all are equipped for being fueled in mid-air in order to increase their range without reducing their payload. Two Handley Page *Harrow* tankers now are being prepared for use at the line's Botwood base in Newfoundland.

The operation is carried out by means of a 200 foot rubber hose, through which fuel flows from the tanker to the flying boat at the rate of 120 gallons a minute. 1,000 gallons of gasoline will be poured into the flying boats' tanks in this manner. The operation is carried out while the aircraft are traveling at about 125 m.p.h. and can be successfully accomplished at any height and in any but the most severe weather. The method has been perfected by Flight Refueling Ltd., in cooperation with Imperial Airways and the British Air Ministry.

Busy Clippers

INTERNATIONAL air traffic at the port of Miami, Florida, "air gateway between the Americas", runs to an amazing volume every year. Last year 2,733 Clipper flying boats arrived and departed on Pan American lines to and from the West Indies and South America, carrying more than 50,000 air travelers, over 1,000,000 pounds of cargo and 298,000 pounds of international air mail—all transported over the far flung air routes between the Americas at 160 m.p.h. on regular schedules.

Plenty of Bombers



BRITAIN was lagging far behind in military aircraft production only a few months ago. Today, she has caught up so rapidly that the Royal Air Force has almost as many airplanes as it needs. The photograph above shows the production line of the Vickers *Wellington* bomber, hundreds of which are ordered for the R.A.F. The *Wellington* is of geodetic construction. This method of construction, clearly shown in the photograph, gives a much lighter airplane than ever before possible. This, consequently, has greatly increased the *Wellington's* carrying capacity. Vickers also makes a single-engined geodetic bomber, the *Wellesley*.

A Neat Little Monoplane

MEMBERS of the Aircraft Mechanics Association of San Diego, Cal., recently completed and flew the trim little lightplane pictured below. Since its first flight the *Minx,* as it has been named, has had approximately 100 hours of flight testing. While the ship does not yet have its Approved Type Certificate from the CAA, it is intended to submit the ship to Government engineers in the near future. According to officials of the Aircraft Mechanics Association, the *Minx* is powered with a 40 h.p. Continental engine, has a top speed of slightly more than 100 m.p.h. and cruises at about 90. Gross weight is 700 lbs., span, 24 ft. 6 in. Range is 400 miles.

MERCURIAL MONOPLANE

A MILITARY airplane that does everything from light bombardment to running errands is indeed versatile. You see the British version of such an airplane on this page: the Westland *Lysander*. An aeronautical prodigy if there ever was one, the *Lysander* is at the same time an observation plane, liaison ship, patroller, supply dropper, bomber and photographer. To get all these things into its bag of tricks the *Lysander* has slots and flaps which give it a minimum operating speed of 55 m.p.h., despite a top speed of 229 m.p.h. It can be seen in the accompanying photographs that the crew in this ship has unusual visibility in all directions. The *Lysander* is designed for a wide range of operating equipment including radio, camera and armament, and the detachable bomb racks you see on some of the *Lysanders* on this page. These stubs serve not only as bomb carriers but also as message and supply droppers. To achieve the varied tasks required in its many duties, the *Lysander* naturally must have particularly flexible performance. Fully loaded with 5,920 lbs. the ship takes off in still air in 495 feet and can clear a 50 ft. obstacle from a standing start in 690 ft. The *Lysander* is powered with an 890 h.p. air-cooled Bristol engine which is fitted with a constant-speed propeller of American design. Range is 600 miles, service ceiling is 26,000 ft. Canada recently got some *Lysanders;* so has the Egyptian air force.

"ROUTINE FLIGHT"

What do airline pilots think of as they fly their runs day after day? Do they think of commonplace things? An airline pilot tells you.

By CAPTAIN ARTHUR L. CAPERTON

"CLEAR—LEFT!" With a circular motion of his right hand, the mechanic stationed near the front of the ship gives this signal to start first the left and then the right engine. It's a far cry from the old "Contact!" and having someone pull the prop through by hand. Direct electric starters and electric primers and boosters do the job a lot better and safer these days. There's the dull thud of the passenger cabin door closing and the pink-faced young agent gives us the righthand salute which clears us away from the loading-ramp.

Taxiing away from the terminal is a particular job and a fellow had better be careful. Always a couple of ships standing near-by and the company would never forgive a bent wing-tip caused by fancy maneuvering on the ground. Then you mustn't use too much power. There might be friends of passengers standing by the gate and it doesn't make for good-will to cover people with dirt and blow their hats off.

All clear of the terminal now and the first officer (co-pilot to you) picks up his mike, calls the control tower and gets permission to taxi out onto the field.

Wind is northwest 12 to 15 m.p.h. and gusty up to 25. Another DC-3 comes away from its terminal in front of us and we taxi slowly down behind him. No hurrying to try to get around in front of him. That would be not only unsafe but a breach of unprinted and unspoken airmen's etiquette. Funny, that ship's from our line's closest competitive fleet and we would like to get off the ground before him, but pilots just don't do that. After all, we're all in the same business, all trying to accomplish the same thing so why try to make it the hard way?

When we arrive at the end of the runway we are going to use, there's a routine to be followed—no matter how many times it has been done or how thoroughly familiar we are with it. Exactitude makes for precision and precision makes for safety. Lock the parking-brake and tail-wheel lock. See that we are on the proper fuel tank. Flaps up. Mixture control rich. Fuel valve on to both engines. Fuel-analyzer switch on. No-Smoking—Fasten-Seat-Belts sign on, propeller controls in full high-pitch and all control-tabs as well as stabilizer control in neutral. Open the left throttle to 30 inches of boost, noting r.p.m., oil pressure and all the gauges having to do with that engine. Try the ignition switch on right and then left magneto to detect irregular running on either. Close the left throttle and do the same with the right. Both engines are okay and the control tower, who has been watching us all this time, gives us the okay to let her roll.

Man and boy, come next Michaelmass, I've been shoving throttles for 22 years and I must admit that there's a thrill to taking an airplane off the ground or water. This thrill increases proportionately with the increase in the size of ship. Used to get a hell of a kick out of taking an OX-5 Jenny off during the War; 2,200 h.p. is quite some increase. But better get on with it—there's the routine, don't forget.

I've always held that a man doesn't get an airplane (or seaplane, for that matter) off one whit quicker by shoving forward with all his might on the wheel or stick. They seem to come off quicker and easier if you just let the tail come up easily and naturally. After all, the horsepower is in the engines, not in the pilot's arms. Pursuing this theory, the DC-3 lifts its wheels off in a very short run and it's time to take off some of that power that the book says may not be used for more than one minute for take-off. It's a matter of adjusting the boost (or throttle opening) to 34½ inches and pulling the props back to 2,050 after we have gotten 110 m.p.h. Holding this speed and power, the rate-of-climb shows about 1,000 feet per minute up. At about 600 feet we can cut the boost down to 28½ inches of mercury and the r.p.m. to 1,900. While all this is going on the first officer has been contacting the control tower, pulling up the wheels and watching the fuel-pressure gauges with one hand on the wobble-pump in case of fuel-pump failure—another element in the routine. The tower gives us his last-minute traffic information and signs off with a cheery, "See you next trip!"

"It's such a beautiful day and so pleasant flying high above billowing clouds that it almost seems a shame to take money for it. I wouldn't trade my job for any other . . ."

Our flight plan (which we made out before getting aboard) calls for 8,000 feet and our first check-point was estimated at 21 minutes after take-off. The ship is fully loaded and the maximum horsepower will be needed to reach this point on time and at 8,000 feet. At 3,000 the few bumps in the air have smoothed out and there are things to be attended to. Switch to the lowest fuel tank. Turn off the cross-feed fuel valve. Change radio from night to day frequency and call the company for a transmission check just to be sure our day transmitter is putting out. Since we have the new non-icing carburetors we don't need to apply heat to the intake, but we push the mixture controls forward to lean out the mixture according to the altitude and power we are using. In order not to take too much out of the engines we consult the cruising power calculator and find that for the altitude and temperature, we should use 28½ inches up to 4,000 feet. This calculation is re-worked at each thousand-foot level and is constantly changing. We have simplified slide-rules for these computations but, after hundreds of trips, a fellow gets to know pretty near from memory about how much boost he may use.

Our gyro-compass had been set to coincide with the magnetic variety some time ago and the twilight "N" of the northwest leg of the Elizabeth range comes in, assuring us that we are on the right-hand side of the road, even though we know it because there are only a few scattered clouds high above us and we can see Lake Hopatcong up ahead; the lake is exactly on our course. Force of habit makes a pilot use the radio range even in CAVU weather; more routine. There are so many trips when the range must be used that it becomes second nature not to bother looking at the ground for reference, but to listen for the "A" or "N" of the radio range along the course. However, this is a dull business, just staring at a lot of instruments and making changes with wheel, rudder and volume-control so I think I'll take it easy and let the first officer fly. The props are at 1,800 r.p.m. and they are perfectly synchronized. The weather is really something rare and I hope I'm not being dishonest in taking my pay check for doing the thing I'd rather do than almost anything else in life. But this reverie is broken up by the "on course" signal of the Allentown radio range which we just passed. They say a telegraph operator will awaken out of a deep sleep if his sounder gives his call; just so do I believe that a pilot would be stirred to action when he hears the signals change on a range course. More routine. Since the First is flying, I'll work the flight log and it goes like this:

We passed the check-point at 22 minutes out of the field and were at 8,000

feet. This is according to the time on the flight plan, so it is a simple matter to estimate how long it will take to get to Elmira at the same altitude. All this is entered on the flight log: the power used, compass course flown, altitude and wind encountered.

"Flight 15 to Newark!"

"Newark to Flight 15!"

"Over Newton intersection at :45 at 8,000. Few scattered clouds, visibility more than 15 miles, temperature 65. Estimate Elmira at :29 at 8,000. Reception good."

Newark repeats this to us and Buffalo, the next station ahead (whom we will contact from now until arrival at that station) gives us his last weather and barometer. He also advises us of traffic at 7,000 and 9,000 eastbound, of course. There is also an Army pursuit out of Buffalo at :40, flying contact. That means he will be at any altitude but we don't have to worry; we can see him today and anyhow he'll be in Mitchel Field almost before we are over Elmira.

That's that. Hang up the mike and put the flight log away. Wonder if that stewardess has any hot food left over? Those boys on the transcontinental have it soft, all right. They just go back in the private compartment and the gal brings them a hot supper with real knives and forks and they sit down to a table and eat like gentlemen. On this run, if you're hungry enough, you don't mind eating out of a box with paper spoons. Another poker game like last night's and I'll really be glad to eat it no matter how it's served.

Three buzzes on the bell and the stewardess comes up to my "office". You can always tell when she's on her way; the ship gets a little nose-heavy and you can feel the change in pressure on your ears as she opens the compartment door. Always thought there was something fishy about that story years ago about that millionaire who was supposed to have jumped out of that Fokker over the English Channel. Both pilots must have been sound asleep not to have felt the ship yaw when (if) the door was opened outboard for him to get out. . . .

The young lady has one chicken pot-pie left over and two ice creams. Settle who's to get the chicken by a toss of the coin and I win. I can't eat and listen to that jargon on the radio. Everybody's supposed to wear headphones at all times, but the First can hear as well as I can and, at a nod from him, I take mine off. Feel naked without them. The food is good and I'm wondering if this fowl could possibly have been raised on one of the farms along the Susquehanna we now are over. As though it made any difference—good anyhow. Can't throw the leavings out the window. We used to, but the people living along the course wrote to the company complaining that their premises were being messed up by the constant rain of paper dishes and chicken bones. That's really on the level—they did.

The book says the captain (at his discretion) shall make one trip through the passenger compartment between stations, so I guess it's time to see if there's anyone interesting on board. Of course, there's alway a guy who flew during the War and can't resist telling about it. Maybe that's a compliment to me. Maybe I don't look old enough to have flown during that disturbance and so they relate some of the most astounding experiences, usually for the benefit of some female passenger whom they are anxious to impress. The customer is always right, so I can look like I am believing that he flew a Spad with a Liberty engine. Funny how different people can be. As I open the door and come into the passenger cabin, I can see signs on the people's faces ranging from obvious enthusiasm to utter boredom. But you never can be sure who you should start a conversation with and who you should leave strictly alone. Always look at men's lapels for aviation insignia because a professional smile and glib remark about the weather would probably get a razz from an aviation executive. Guess I'll make a few polite remarks to the enthusiastic ones and get back up there where I belong because I think I spot a slide-rule specialist in Seat 12. Some of those fellows can get a pilot wound up worse than a prosecuting attorney.

". . . Emergency! Trip 5 says his de-icers are turning out ice cubes! . . ."

It's much nicer up in the left-hand seat and headphones feel more like a proper job was being done even if the static nearly drives me crazy. I can remember not so long ago when there would be long periods of time when you couldn't hear a soul say a word on the company set, simply because they weren't saying it. Now you can't tell what they are saying because they're all saying it at the same time—and all the time. Traffic information, barometer, pressure altitude, Trip So-and-So calling somewhere—all stuff you aren't interested in, but if you don't keep a sharp ear, someone will call you and it's best to answer or there's a "No Contact" marked up against you and there will be letters to answer and static alibis to establish. I'll be glad when there's the new-fangled radio-teletypewriter installed in each ship. Then, I suppose, some guys will bellyache because they have to read it once in a while.

The Susquehanna bends sharply to our right as we hold our compass course of 317° and the city of Elmira lies up ahead in the haze. The radio range station is a couple of miles northeast of the city and the First is doing plenty of work on his wheel and rudder to follow this screwy revolving range. After counting three separate cones of silence, looking down at the range antenna and hearing the signals spill over into the company short-wave receiver, we are convinced that we have passed this milestone in our trip. Somehow, it seems like cheating to go over a radio check-point without listening to its characteristics just as though one is actually on instruments, just not doing a job, that's all.

Time I did a little work on this trip. So I take over and the First works the flight log, makes his report and reaches for his lunch box. These props have gotten out of step just a little and that's one thing I can't stand. I sometimes can tell whether a pilot has an ear for music or not. If he lets props stay out of step long, I know he hasn't. I'm no musician, but I hate to hear that particular type of discord. Once I had a songwriter from Tin Pan Alley on board and he told me he had composed a melody to the rhythm of perfectly synchronized propellers—had the music written in pencil when he landed in Newark and dashed to the nearest piano to try it out.

The instrument panel of a DC-3 looks to a layman like a maze of baffling dials, but it doesn't take long to review every one of them in flight and any one which might be other than normal sticks out like a sore thumb. This time it's the right engine fuel-analyzer indicator which is a little too lean and I charge the very small oversight to the First's interest in his cold breast of chicken and the fact that everything is going just too ducky. But he sees it almost as soon as I do and reaches out for the lever that controls the mixture with a sheepish grin and a little more animation just to let me know he's still alive and with me. Maybe I've set a bad example, relaxing in this too perfect weather. Think I'll get under the hood from Buffalo to Detroit.

(*Continued on page* 70)

NEWEST OCEAN AIRLINER

IF the British ever get around to giving Pan American Airways transatlantic competition, they probably will use this flying boat, the first of which just has been completed. Another Short Brothers product, the "G" class flying boat on this page is expected to have a normal loaded range of 3,400 miles. Almost identical to the smaller "Empire" class boat from which it was copied, the *Golden Hind* (named after Sir Francis Drake's 16th century vessel) is the first of the new class to be completed. It is powered with four Bristol *Hercules* engines of 1,175 h.p. each. Cruising speed is rated between 180 and 190 m.p.h. Span is 134 ft. 4 in., loaded weight 31½ tons. Obviously intended for transatlantic service, the British are nonetheless vague about the *Golden Hind's* passenger capacity. Meanwhile, two sister ships (the *Grenadine* and *Grenville*) are nearing completion.

DeMILLE, THE AIRMAN

By KURT RAND

Few people know that one of Hollywood's most famous producers also is one of aviation's earliest pioneers. He started an airline in 1919 and still keeps his hand in now and then.

Cecil B. DeMille today, in the cockpit of a Lockheed.

GOVERNMENT officials told him that he was too old to take the regular Army flying course to get into the Air Corps during the World War. They promised, however, that if he learned to fly at his own expense and passed the examinations under Col. Harvey Burwell at Rockwell Field, San Diego, California, he would get a commission . . .

So Cecil B. DeMille, the one great director of motion pictures who never has undertaken an aviation epic, launched on a flying career which lost him $300,000, resulted in the establishment of the first regular airline in the world, a "test" air-mail contract, and a squadron of 12 airplanes operating from three airports. He incidentally collected a record of nearly 1,000 hours of day and night flying after taking his scenarist, famed Jeanie Macpherson, on his solo hop. He persuaded her and his daughter, Cecelia, to fly, took Producer Sam Goldwyn on his first thrilling ride and finally got himself grounded by his studio for hopping ships while making such productions as the $1,500,000 "King of Kings," one of the greatest motion pictures of all times.

He settled back in a carved chair behind a carved desk in his medieval study atop a Hollywood hill today and told me the story of his adventures.

"I still can see Adolph Zukor wringing his hands as I flew my old JN4-D over the sets," he declared. "He didn't think it was right that each day, after work, I should go skimming around in the clouds risking the future of a million dollar production."

DeMille, directly after he had learned he could get a commission and fly overseas, scouted for an airplane.

"Early in 1917," he said, "we found a cracked-up Jenny—the pilot had been killed—in Ontario, Canada. We had it shipped to Hollywood and completely rebuilt. The late Al Wilson, who shares

Here DeMille adjusts Sam Goldwyn's helmet before taking him for first flight.

the daring honor of being one of Hollywood's greatest stunt pilots with Omar Locklear, was my instructor.

"We picked a flat, level place near Santa Monica. I reported each day for instruction. Even while I was learning, people crowded onto the field. Finally a fellow came to me and asked me: 'Will you take me up for ten dollars?' I referred him to Al, who pocketed the money, gave him a two-minute hop. When Al came down, 20 or 30 people were waving bills and asking for rides.

"All that money gave me the germ of an idea. Pretty soon, Al was flying cash customers both before and after my instruction. After all, it was my ship . . ."

So DeMille told Wilson to send for another Jenny and hop the passengers. They couldn't buy one in the United States—all were being used for training purposes—so they found a Canadian job and had it shipped in. Two planes soon graced the plain, and the avid customers pleaded with DeMille to fly them.

"Get a third plane, Al," said DeMille.

Instead, Al got two. And, just as DeMille was ready to get his commission, the Armistice was signed. Soon, airplanes could be had everywhere. The DeMille Aviation Company needed larger quarters, so it was moved to DeMille Field No. 1 on La Cienega Boulevard between Wilshire and Santa Monica Boulevards. There was plenty of space, then. Today, it's a thriving business and residential district.

"And then, at our new quarters," DeMille said, "we found people who asked if we could get them to San Diego, Santa Maria, San Francisco, in a hurry. People wanted aerial photographs—real estate operators and even the Government. Others wanted to learn to fly. So I decided to form a regular company and, late in 1918, the Mercury Aviation Company burst into full flower. DeMille Field No. 2 came into being at Wilshire and La Cienega. We organized, got officers, a board of directors, and a prospectus. We sold planes to Mexico, opened a service department, mapped, photographed, rented planes to motion pictures, instructed, carried sightseers, bought DH's, installed Hispano-Suizas in our equipment."

This is DeMille and his favorite Jenny. He bought this ship after it had crashed and killed its pilot. He learned to fly in it and kept it as long as it was flyable.

What is believed by DeMille and many others to be the first regular airline went into service early in 1919. The line offered non-scheduled flights to Chicago and New York city and went on schedule between Los Angeles, San Diego and San Francisco. The time to San Francisco was eight hours, rates were approximately five times as high as they are now on both runs.

A Los Angeles newspaper predicted editorially:

"Already the DeMille corporation has arranged for an air service between this city and San Francisco that will make the railroad seem like a snail, and regular transcontinental service will follow . . ."

San Francisco newspapers covered the first scheduled flight and the arrival in the Bay City. DeMille expanded to a third Los Angeles field, conducted surveys up and down the coast, even established a

DeMille Field No. 2 was a beehive of activity, even as far back as 1919. In this picture are eight Jennies bearing the DeMille company's name, and one Army DH. In the background are oil wells.

This is one of the two DeMille Jennies which locked wings in midair when a wing-walker became panicky. Luckily, both ships got down without injuring their pilots.

field in Pasadena, where none exists today, 20 years later.

"The service continued for a while," DeMille said. "But the service wasn't regular enough—the Jennys and DH's had a habit of being forced down by fog, bad weather and engine trouble—so we expanded. We had about 10 planes. We bought a couple of low-winged Junkers cabin monoplanes—the first cabin jobs to be used on the coast—and put them on the San Diego run to speed things up."

Eddie Rickenbacker delivered the first Junkers. DeMille, who never has been slow on the uptake as far as publicity is concerned, immediately called several prominent people, including Harry Chandler, publisher of the Los Angeles Times, John B. Miller, president of the Southern California Edison Company, and John Fisher, a prominent business man.

"I want to impress them with the safety of a flight to San Diego," he told a secretary. "I am going to have them come to the field, fly to Coronado for lunch, return in time to finish their day's business. Toss in a book for me to read, will you? That ought to sell 'em."

DeMille, in flight later, with Al Wilson at the controls, dragged out the book and started scanning it—not too carefully.

"Good heavens!" exclaimed Chandler. "Look what he's got!"

DeMille looked at the cover for the first time. The title was "The Broken Wing."

The producer saw the advantages of a line to Mexico City because of a lack of highways and the slowness and uncertainty of rail transportation. His export company sold a Junkers to the Mexican government and many flights were made to Mexico City. About this time the United States Government began to have trouble with the Junkers, and DeMille abandoned the plan without settling on a schedule, although he had secured permission of the Mexican government to fly over and land at Mexico City on scheduled flights.

While local newspapers were announcing "L. A.—New York Airline Next Step in Progress," the Mercury Aviation Company was booming. As publicity stunts, the company landed a famous golfer right on the course with his clubs, ready to play; carried a small horse to Santa Barbara for a horse show, where it won a cup; flew Ex-Champion Jim Jeffries' calf hither and yon, and transported even cats and dogs.

"We had quite a time with the S. P. C. A. when we announced that the horse was to be an airline passenger," DeMille recalled, with a smile. "The heads of the organization said we were being very cruel. A compromise was effected. We were to stuff cotton in the animal's ears. We got expert testimony to the effect that this would make the horse most uncomfortable—and finally did the job on schedule."

By this time, the Government was flying the airmail transcontinentally from New York to San Francisco. The Mercury Aviation Company got a six-months' test contract as a private operator, but there weren't enough flights completed. But for a while, bags went slowly and merrily through the skies to San Francisco and San Diego.

"We, as operators, felt we should serve food to the customers," DeMille said. "And it was chicken."

No change there in two decades.

Money came in rapidly from airplane rentals to film companies. Harry Houdini made a picture at the DeMille fields, called "The Grim Game." A wing-walker, doubling for Houdini, got down on his ladder and "froze." The pilots jockeyed and jockeyed — and finally locked wings. They started a double flat spin, broke apart. One pilot landed with the wing-walker still clinging to the ladder, with a shattered upper right wing. The other came in with more serious damage, rolled over on its back.

"No one was injured," DeMille recalled. "The pilots jumped from their ships, took out after the frightened wing-walker to vent their wrath, for he was the cause of the accident. They didn't catch him. So far as I know, he's never been back to Hollywood since."

DeMille personally opened the field at Pasadena. The Board of Trade and 10,000 other Pasadenans turned out in full force. He got options on fields all up and down the coast. His planes were coming in at Oakland, Barkersfield, Santa Barbara, Santa Maria and many other points now on the U. A. L. and W. A. E. lines.

Later, Omar Locklear was killed with his mechanic and wing-walker during a night flight for a motion picture at DeMille Field No. 2. There were other accidents in the course of the daring business of photographing "thrillers."

"But we carried more than 25,000 persons on city-to-city hops and on sight-seeing flights and never injured one," DeMille recalled. "We had a perfect record, even on inter-city runs and I'm still proud of what we did."

DeMille kept the original Jenny as his private plane. Fired with enthusiasm, he flew it every chance he got—and persuaded many famous people to fly with him, including Sam Goldwyn, Mayor Snyder of Los Angeles, Miss Macpherson, who later became a qualified pilot; and a number of motion picture players, including Julia Faye.

"I nearly broke my neck and Julia's, too, on our first flight," DeMille re-

(*Continued on page* 89)

The date is August 11, 1920 and the airplane is the first Junkers airliner being delivered to the DeMille field by Eddie Rickenbacker. The Junkers later was banned.

GUARDSMAN

The foothills of the Olympic Mountains in Washington are the background for this Coast Guard patrolman.

The white outlines indicate the Alameda base and Navy supply depot. Oakland is in foreground, Treasure Island at upper right.

The Navy BUYS SOME MUD

by PAUL CONANT

When Uncle Sam finishes the job he's started out in California, the Navy will have one of the biggest air bases on earth. Here's a preview inside look.

ALL things come from Mother Earth—even airplanes. Nobody can speak for 1999, but in 1939 you can't fly the blamed things indefinitely, in a state of perpetual motion. You have to have airports and bases, repair shops and runways, grease monkeys and weather sharks. Congress, oddly enough, has not always given much thought to this rather simple idea. If it had, why would the Pacific Coast have been left for lo these many years exposing a solid stretch of coastline, 2,000 miles long, without a single Naval air base? Nobody knows why Congress does or doesn't do the things it does and doesn't do, but that's a fact: there isn't a Navy air station between San Diego and Puget Sound.

There isn't, but there will be. What with the heat on in Europe, Asia, South America and other points of the compass, Congress finally got around to fixing this little matter. Don't look now —it's all a very uninspiring stretch of mud flat—but next year operations will begin at the Navy's newest air station—near Alameda, on San Francisco Bay. It is officially entitled the Alameda Naval Air Fleet Base. It will set the taxpayers back $13,500,000 but, from all the observation data at hand, it'll be worth it.

Rear Admiral A. B. Cook, until recently chief of the Navy's Bureau of Aeronautics, testifying not long ago before the House Naval Appropriations Subcommittee, said that the new base will be one of the largest overhaul repair bases for all types of Naval airplanes on the continent. He added that speed is the watchword on the job, since any delay will mean that the workload intended for Alameda will have to be diverted to Norfolk, San Diego, Pensacola and the Naval Aircraft Factory at Philadelphia. They have plenty to do already.

The new station will have barracks ready for necessary personnel, along with assembly and repair shops, early in 1940. Limited operations, Admiral Cook told the subcommittee, will begin about April 1 of that year. Patrol planes also will be stationed at Alameda in 1940.

but full operation of the base will not begin until 1942. By that time, the station will be as busy as a hatful of bees. There'll be facilities for as many as 400 planes, including landplanes from the carriers as well as a couple of squadrons of big patrol ships. There'll be room for 10,000 officers and enlisted men!

You wouldn't believe it, if you looked at the place today.

If you can get past the Chamber of Commerce, which wants to tell you what the Navy payroll is going to mean to everybody (and it's going to mean plenty!) you go on down through Oakland and across an estuary to Alameda, which is in reality an island. Then you keep traveling out a long sandspit in the general direction of the new bay bridge and San Francisco, but you don't get that far. You stop near a deserted building marked "Pan American Airways" and you look up an energetic officer named Commander Edward C. Seibert. He's Public Works Officer for the 12th Naval District, and he will immediately tell you that Pan American doesn't live here any more; the Clippers have moved to Treasure Island.

Well, you weren't looking for any Clippers anyhow, so then maybe Commander Seibert will invite you to have a look. You look at sand. There's about 13,000,000 cubic yards of it in front of you—dredged up from San Francisco Bay to form an air station covering almost 900 acres. If the Navy ever wants the place to be bigger, it owns plenty more underwater land next to the present site—a total of more than 2,000 acres and all it needs is filling in. But 900 acres is enough for a while. Most of the reclamation now is finished and foundations are being laid for permanent buildings.

The station is divided roughly, as Commander Seibert will tell you, into two major parts: one, facilities for landplanes, and, two, facilities for seaplanes. At the southeastern tip of the base is a lagoon for the seaplanes. This is enclosed by jetties and has wide ramps for putting big patrol ships ashore or afloat. Immediately behind the ramps are two seaplane hangars. At the west end of the site are the six hangars for landplanes (there are provisions for two more) and an extensive landing mat. At the very westernmost edge of the base, near the old Pan American headquarters, are slips for airplane carriers.

As you look out over the barren sand flats where dredges are still spewing up mud and sand, you take stock of the shape of things to come. Commander Seibert helps you to visualize the facts and figures and here they are, in broken doses:

Pumping and filling takes the largest single item in the appropriation, $2,000,000. Landplane hangars cost $1,400,000. The seaplane hangars nick Uncle Sam a neat $730,000. Barracks and mess facilities are $1,600,000. A repair shop goes to the tune of a round $1,000,000, and the electrical system $500,000. Storehouses are $800,000, the piers and slips $789,000, officers' quarters $324,000, roads and landscaping $288,000. A "dope" shop adds up to $275,000. Water supply, heating, boilers, gas, aircraft stores and a few other items run the whole thing up to $13,500,000.

The assembly and repair shop will be one of the largest in the world—400x400 feet—and will have central bays with cranes, so that aircraft may be taken inside in one piece and disassembled. There also will be engine overhaul shops, instrument shops, fuselage overhaul sections and a spray booth for structural work. A motor test shed, which itself will cost $125,000, is also said to be one of the biggest and most complete ever designed.

Just to give you an idea of sizes, aside from the 400x400 assembly shop, here are a few dimensions: the administration building, 200x200; seaplane hangars, 350x250; two aircraft storehouses, 100x400 each; landplane hangars, 200x200; general storehouse, 100x400. A single pier and slip for carriers will be 1,000 feet long. Incidentally, no building more than ten feet high is permitted on a line with the major runways.

So, you see, the new fleet base may be a baby just now, but it has all the symptoms of being a whopping big baby.

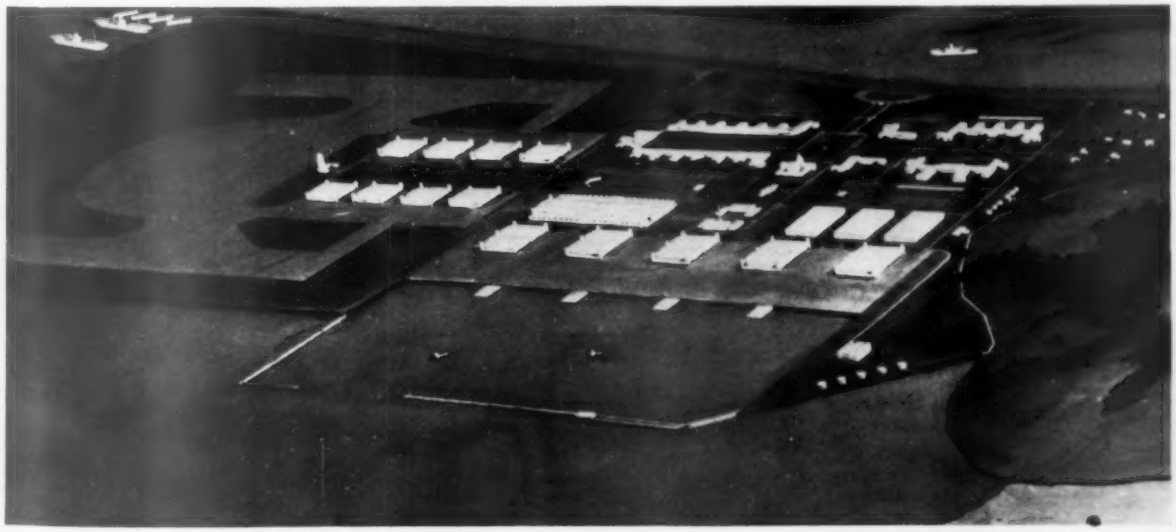
You learn that the initial detachment of enlisted men in 1940 will be only 50. A year later the permanent party will number 600—augmented by about 3,500 transient enlisted men at all times. The maximum strength at this station, including transients from visiting carriers, will be 10,000. The base will be prepared to keep in service from 300 to 400 planes. Facilities are being built to take care of the complement of landplanes for an entire squadron of aircraft carriers. That's a total of around 250 planes in one swoop. There will also be accommodations for two squadrons of seaplanes of 12 patrol planes each. Many more aircraft can be handled under emergency conditions. There's room, too, for assorted utility craft.

All this means there'll be plenty of action out there where you see the sand flats sleeping in the sun today. These flats, by the way, were acquired by the United States Navy for about two dollars—just enough to make it all legal. Alameda airport, where Pan American Airways had its Pacific Division headquarters and a seaplane basin until it moved to Treasure Island, was deeded to the Navy by the City of Alameda. Cost: one dollar. Benton Field, where the new naval base's administration building, barracks and officers' quarters will be, was willed by the Army. Cost: one dollar. Neat as a pin, that deal.

A valuable next-door neighbor to the air station will be the Naval Supply Depot, just north, finally authorized by Congress. The development of these two projects gives some hope that the

(*Continued on page* 74)

This model of the finished base shows seaplane basin at lower right, landing mat for landplanes at left. Far left are slips for aircraft carriers. Buildings in center are hangars, shops, barracks.



Alaskans are SOME

The airplane is a vital part of Alaska's daily life. Here a seaplane lands on Juneau's waterfront.

by TED LEITZELL

Photographs by Leonard Delano and James Montagnes.

You hardly have flown until you've ridden with an Alaskan airman. They regularly fly jobs the average commercial pilot would turn down as too risky to try.

This pilot thinks nothing of picking up single letters from snowed-in Alaskans.

I WAS flying from the Peters Creek mine west of Talkeetna, Alaska, to Anchorage with Chris Christianson and couldn't see the point in getting so much altitude. There wasn't a safe landing spot in sight between the mine and Anchorage—it was a wet mess of lakes, muskeg, brush, timber, and glacial rivers.

"It's this way," explained Chris. "If we have to come down it's better over by the river; then somebody can reach us in a boat, and we won't be a month walking out. In a few minutes we'll be close enough to the railroad; that's even better."

He went on to tell about a trip he had made a few days earlier: a man with a broken leg he was flying to the hospital in Fairbanks.

"I lost a little time by taking him around by the railroad instead of going cross country, but I knew I could set it down on the tracks without nosing over and that we could get him to Fairbanks on a train or speeder. Suppose I'd had a forced landing with him in muskeg; we'd have nosed over sure and had a hell of a time getting him out. Then I'd have had to leave him there while I walked out for help—and that might take a week."

Chris spoke from his years of experi-

PILOTS

ence in running a charter service out of Cantwell. He knows that any of the boys can expect a crash somewhere on an average of about once a year. He has averaged fewer than that, but never makes a flight without planning for possible landing spots where the passengers will be safe and where the ship can be saved.

When you figure that there are a lot more miles flown every day by the charter companies of Fairbanks, Anchorage, and Cantwell than by all of the regularly scheduled flights in a week, and that plenty of ships are forced down every year, it may seem surprising that there are very few fatal crashes. One reason is that the boys know the country. Another is the light stuff they fly: Wacos, Stinsons, Bellancas, etc., which land at low speeds. When you are getting in and out of tight spots the light ships have it all over the fast Lockheeds that make the scheduled runs from Juneau to Fairbanks, etc.

They're still talking about one Chris pulled at Peters Creek. The field there is on a hillside above the valley, with a gentle slope to the low cliff that walls the creek bed. The only way to take off is downhill, regardless of wind. One day they called Chris by radio to take in some parts for repair. If they hauled them to Talkeetna by tractor and shipped by train to Anchorage the time loss would be at least a week; by air it was a matter of hours.

The load was pretty heavy and Chris had his doubts, because his downhill take-off was also downwind. He was still on the ground when he went over the edge of the cliff, but managed to keep the ship in the air a few feet above the creek. Observers were sure he was going to crash into derricks or trees before he got climbing speed, but he dodged them by inches and built up enough speed to zoom over the high cliffs at the end of the valley with not a foot to spare.

Another prize story is the way Chet Brown and Oscar Winchell of Star Airways in Anchorage used two-way radio to get Chet out of a nasty hole. Chet took off one morning from McGrath in the wild, rough country west of the Alaska Range. Before he had been gone many minutes his motor cut out. The sky was clear, but he had to land through a blanket of fog. The ship was

(*Continued on page* 80)

A Canadian Fairchild takes off from Juneau. Note gold mine on mountainside.

No place is so remote nor is any job so difficult that the Alaskan airman can't cope with it. This plane is returning to pick up a trapper it left here months ago.

This ship was flying in a load of supplies and mail when it crashed while landing on treacherous ice. A quick radio call and a sled and dog team carry on from there.

Short, cryptic weather data come in over teletype machines day and night. Above is a United Air Lines station. Below, an American Airlines meteorologist checks weather.

Weather

by MAURICE RODDY

Aeronautical weathermen have devised shortcutting symbols to pass on information rapidly.

DURING the "horse and buggy" days it was a certain sign of rain when grandpappy's corns started to ache. Immediately, the signal was relayed to the courthouse square and general store and the chairs and boxes were taken inside, where the weighty discussions of the moment were resumed.

Weather, as pictured by Mark Twain, was something that everybody talked about, yet did nothing about. However, that was in the grand old days of Mississippi steamboating. Today is the age of air transportation and aviation has done much concerning weather. In cooperation with the United States Weather Bureau facilities and other Governmental agencies, air transport companies have developed one of the finest weather forecasting and reporting systems in the world. Correct and rapid weather information is of paramount importance, when scheduled transcontinental operations are considered.

Meteorological data is distributed over 25,000 miles of radio-equipped network and teletype circuits in the federal airways system. Augmenting these reports are the frequent observations of pilots in flight. In order to make material even more informative, the Weather Bureau recently instituted changes in transmission of its weather information to airline personnel. A new system for symbolizing the observational data has been developed which will furnish greater detail on weather and flying conditions over the air routes and also shorten time required for transmissions.

Symbol changes were made necessary by the increased amount of information now sent out and because of the addition of more weather stations to the existing meteorological locations. Gradual increase in the number of stations plus the added service of furnishing altimeter settings have been absorbed effectively by code and symbol revisions.

As defined by the Department of Agriculture Weather Bureau at Washington, altimeter setting is "a pressure, in inches, used for setting a pressure-scale type sensitive altimeter in an airplane so that

er Symbols

upon landing of the airplane at an airport the pointers of the instrument will indicate an altitude reading equal to or very close to the field elevation above sea level, provided that the instrument is functioning properly. The 'altimeter setting' should be determined by a properly equipped station near the time and place of landing and should be furnished to the pilot for setting his sensitive altimeter just prior to landing." Previously, only sea level barometric pressure was given.

Simplicity of altimeter setting reports as now sent may be illustrated by these examples: 014 is sent in the teletype message to represent 30.14 inches; 981 to represent 29.81 inches. At present, sea level barometric pressures are transmitted in terms of millibars.

According to R. L. Currie, senior meteorologist for American Airlines, another distinct improvement in weather transmission is the change in reporting procedure on teletype messages, which are now called synoptic reports. This is a one-sequence report in which all observations over the country are taken at the same time instead of at varying periods as was the former custom. Observations will be made at 30 minutes after the hour for the entire day.

Order of elements in reports now transmitted by teletype and point-to-point radio follow:

(a) STATION DESIGNATOR
(b) TOTAL AMOUNT OF SKY COVERED BY CLOUDS } as one group
One space
(c) CLASSIFICATION (1) one letter
One space
(d) TYPE OF REPORT (2)
One space
(e) TIME OF REPORT (3)
One space
(f) CEILING (4)
(g) SKY (5)
(h) VISIBILITY (6)
(i) WEATHER (7)
(j) OBSTRUCTIONS TO VISION (7) } as one group
One space
(k) BAROMETRIC PRESSURE (8)
(l) TEMPERATURE
(m) DEW POINT
(n) WIND AND WINDSHIFTS } as one group
One space
(o) ALTIMETER SETTING (8)
One space
(p) REMARKS in symbols and abbreviations.

This TWA meteorologist is transferring data from the teletyped weather symbols to the regular weather maps drawn up several times daily. Note old map in background.

(1) is sent only by stations at controlled airports within controlled zones. Type of report (2) is given only in special cases and local extra observations. (3) Likewise for time of report. (4) If the ceiling is unlimited, no ceiling data required. (5) Sky conditions are not sent when the sky is not observable due to precipitation or obstruction to vision. (6) Visibility value is not sent, if visibility is 10 miles or more. (7) No entry is made if no "weather" or "obstructions to vision" occurring. (8) Is sent only by stations equipped with mercurial barometers.

Ceiling height up to and including 9,700 feet above the station is indicated by figures representing hundreds of feet. Example: 35 indicates 3,500; 8 indicates 800. The figure 0 is used to denote a zero ceiling, while the letter E is used for estimated ceiling heights between 50 and 9,751 feet above the station. It is placed immediately preceding the figures, but is never applied to the height of scattered clouds given in preceding appropri-

Once weather data has come in on teletype and map has been plotted, the meteorologist and flight superintendent discuss the remainder of the day's flight plans.

ate sky conditions, whatever they may be.

A plus sign is used preceding the ceiling figures when a ceiling balloon is blown out of sight before reaching the clouds. Accordingly, +10 would indicate that the ceiling was more than 1,000 feet, which was the last observed height of the balloon. The letter V denotes a ceiling below 2,000 feet and changeable. It follows the ceiling value.

Observable sky conditions are indicated by the following symbols:

- ○ Clear
- ◑ Scattered clouds
- ◍ Broken clouds
- ⊕ Overcast
- ◑/ High scattered
- ◍/ High broken
- ⊕/ High overcast
- ⊕ ◍ Overcast, lower broken
- ⊕ ◑ Overcast, lower scattered
- ◍ ◍ Broken, lower broken
- ◍ ◑ Broken, lower scattered
- ◑ ◍ Scattered, lower broken
- ◑ ◑ Scattered, lower scattered
- ⊕/◍ High overcast, lower broken
- ⊕/◑ High overcast, lower scattered
- ◍/◍ High broken, lower broken
- ◍/◑ High broken, lower scattered
- ◑/◍ High scattered, lower broken
- ◑/◑ High scattered, lower scattered

Plus or minus sign preceding cloudiness symbols indicate "dark" and "thin" respectively. The slant mark is considered a symbol, whenever the "scattered clouds" symbol occurs as the last symbol in a sky condition.

Height of scattered clouds is determined by insertion of the proper figure or figures preceding the symbol without space or oblique. Absence of value indicates a visibility of 10 miles or more, while visibilities from zero up to 10 miles are indicated by figures denoting values in miles and fractions. For instance: 0 indicates zero visibility; 1¼ indicates a visibility of one and one-fourth miles. Entry of the letter "V" following visibility value indicates visibility of two miles or less and fluctuating.

Weather element of teletype reports is described by the following symbols: R—, light rain; R, moderate rain; R+, heavy rain; S—, light snow; S, moderate snow; S+, heavy snow; ZR—, light freezing rain; ZR, moderate freezing rain; ZR+, heavy freezing rain; L—, light drizzle; L, moderate drizzle; L+, heavy drizzle; ZL—, light freezing drizzle; ZL, moderate freezing drizzle; ZL+, heavy freezing drizzle; E—, light sleet; E, moderate sleet; E+, heavy sleet; A—, light hail; A, moderate hail; A+, heavy hail; AP—, light small hail; AP, moderate small hail; AP+, heavy small hail; OP—, light snow pellets; OP, moderate snow pellets; OP+, heavy snow pellets; T—, mild thunderstorm; T, moderate thunderstorm; T+, severe thunderstorm; SQ—, mild snow squall; SQ, moderate snow squall; SQ+, severe snow squall; RQ—, mild rain squall; RQ, moderate rain squall; RQ+, severe rain squall; SW—, light snow showers; SW, moderate snow showers; SW+, heavy snow showers; RW—, light rain showers; RW, moderate rain showers; RW+, heavy rain showers.

TORNADO is always written out in full.

Use of a direction arrow entered immediately following the last wind data denotes a wind shift showing direction of the wind prior to shift to eight points of the compass, followed by local time, local time zone, plus intensity indication shown by minus or plus signs for "mild" or "severe".

The following symbols denote obstructions to vision: F— —, damp haze; F—, light fog; F, moderate fog; F+, thick fog; FF, dense fog; GF—, light ground fog; GF, moderate ground fog; GF+, thick ground fog; GFF, dense ground fog; H, hazy (dry haze); K—, light smoke; K, moderate smoke; K+, thick smoke; D—, light dust; D, moderate dust; D+, thick dust; BS—, light blowing snow; BS, moderate blowing snow; BS+, thick blowing snow; GS—, light drifting snow; GS, moderate drifting snow; GS+, thick drifting snow; BD—, light blowing dust; BD, moderate blowing dust; BD+, thick blowing dust; BN—, light blowing sand; BN, moderate blowing sand; BN+, thick blowing sand; IF—, light ice fog; IF, moderate ice fog; IF+, thick ice fog; IFF, dense ice fog. These, it is seen, cover all conditions.

Airline pilots discuss weather they must fly through with flight superintendent before the flight starts. The slightest changes are immediately transmitted by symbol.

Temperature is indicated in figures giving nearest degree Fahrenheit. Dew point is given in similar figures following the temperature from which it is separated by a slant mark.

Below zero temperature is denoted by entry of a minus sign preceding the temperature figures.

Wind direction arrows follow:

- ↓ North
- ↓ ↙ North-northeast
- ↙ Northeast
- ← ↙ East-northeast
- ← East
- ← ↖ East-southeast
- ↖ Southeast
- ↑ ↖ South-southeast
- ↑ South
- ↑ ↗ South-southwest
- ↗ Southwest
- → ↗ West-southwest
- → West
- → ↘ West-northwest
- ↘ Northwest
- ↓ ↘ North-northwest

Figures determining miles per hour denote wind velocity, while the letter C denotes calm. E following the figures is used for estimated calculations. Minus sign following velocity, without space,

(Continued on page 82)

THE Man UNDER THE Hood

DON'T you believe the rumor that's making the rounds once again about **C. R. Smith** . . . that is, of course, if you're willing to take none other than C. R.'s own word for it . . . he will *not* become president of Pan American Airways in the near future . . . he's perfectly content with being president of one of the biggest domestic airlines in the country . . . next time you hear that rumor, though, try and find out who started it . . . we'd like to know . . .

* * *

Regarding airline officials, you can overlook the talk that **P. G. Johnson**, onetime president of **United Air Lines**, is returning to that airline . . . **Johnson** has been up in Canada these last few years setting up **Trans-Canada Airlines** . . . now that that's practically completed and TCA already is operating, he may return to the U. S.—but probably not to **United** . . .

* * *

Here is what we might call the story of the year . . . **Major Lester Gardner**, secretary of the Institute of the Aeronautical Sciences, was the center of the trumped-up scene which took place aboard the *Queen Mary* during the return voyage to the United States of several American newspapermen who made the first flight across the Atlantic aboard a Pan American clipper . . . actors in the "plot" were **John C. A. Watkins**, author of many an article for POPULAR AVIATION; **Devon Francis**, aviation editor of the Associated Press; **William Van Dusen**, Pan American publicity director; and **Noel Pemberton-Billing**, the Englishman who founded the Vickers-Armstrong and Supermarine Aircraft companies . . . they decided to rib Gardner with a pseudo spy plot, cast as follows: **Watkins** was "Cadet Count Peter Jacka" of the Czechoslovakian air force, escaping to the U. S. on a forged passport . . . among other things, "Count Jacka" was supposed to be stone deaf . . . **Gardner**, a little more spy-conscious than the average person, spent most of the day writing notes in French to the "deaf" Czech, then hastily destroying the notes . . . meanwhile, **Francis, Van Dusen** and **Pemberton-Billing** kept the joke going by yelling into **Watkins'** ear in efforts to make themselves understood . . . the second day, the plotters saw to it that **Watkins** received a coded cablegram —in **Gardner's** presence, of course, containing only one recognizable word "Langley," the name of one of the U. S. Navy's seaplane tenders . . . **Gardner** became more and more suspicious of what he was sure was a Nazi spy . . . The climax came that evening when a "fixed" purser suddenly walked in on the group and scared **Gardner** white by announcing, "I'm sorry to break in, gentlemen, but the captain has instructions from the British Foreign Office to arrest one of your guests on an espionage charge. His name is Cadet Count Peter Jacka" . . . **Francis** leaped to his feet, turned to **Van Dusen** and cried: "You did this; you tipped them off" . . . then **Francis** turned to the purser and said: "This charge is ridiculous. Major Gardner here, one of the most prominent men in American aviation, can vouch for the Count . . ." . . . Gardner leaped to his feet, white-faced, and yelled: "Oh no I can't! I never saw this man before in my life. Go ahead and arrest him!" . . .

Gardner

Watkins, meanwhile, kept things going by suddenly thrusting his hand into a pocket as though he had a gun . . . **Gardner** paled and cringed even more as the "Count" backed toward the door stealthily . . . then **Pemberton-Billing** calmly walked over, took **Watkins** by the arm and asked him where he thought he was going . . . Gardner marvelled at the sight of this "bravery" . . . then **Watkins** replied meekly: "I was just going to the bathroom . . ." . . . then everyone in the room broke into uproarious laughter before the amazed **Gardner** . . . during the rest of the trip everyone who knew the sheepish butt of the joke clicked their heels and bowed from the waist whenever they met him . . . he was a fine sport about it . . . he even wanted to reenact the entire "plot" . . .

* * *

We'd been wondering what had happened to **Jimmy Mattern** . . . then word came the other day that Jimmy's down in Texas . . . this time he's not just flying for an oil company . . . he's in the oil business himself . . .

Mattern

* * *

The War Department still is going full blast on contracts for new aircraft . . . just as fast as we get hold of one batch of orders, the Army sends out another . . . now the St. Louis Aircraft Corporation has an order for $139,419 worth of trainers . . . **Waco** also has a sizeable order for trainers . . . **Stinson** will build $1,500,000 worth of observation planes . . . **Bellanca** will build $50,000 worth as will Ryan . . . **North American**, meanwhile, has gotten an order totaling $2,500,000 for basic combat monoplanes . . . **Vultee** also is in on this type of airplane with an order for $90,000 worth of basic combat ships . . .

We hear the Army has some new four-engined bombers in mind . . . as we understand it, **Boeing, Consolidated** and **Douglas** already have drawn up tentative bids on what they think the Army wants . . . whatever the finished and accepted ships are, they'll be whoppers . . . the prices bid on them ably illustrate that . . . for instance, in lots of 10 airplanes we understand **Douglas** wants $840,000 apiece, **Consolidated** $432,-187 each and **Boeing** $286,000 each . . . meanwhile, there are other bids in the offing, these for advanced trainers and twin-engined bombers . . . **Vultee, North American** and **Curtiss-Wright** have bid on the trainers . . . **Martin, Stearman, Consolidated, Vought-Sikorsky, Burnelli, Douglas** and **North American** on the bombers . . .

* * *

Lieut. Ben Kelsey, the dashing young fellow who set a new transcontinental speed record recently by flying the Army's **Lockheed** XP-38 coast to coast in a little over seven hours only to crash near Mitchell Field, New York, cracked up again the other day, we understand . . . this time it was a standard P-36 fighter . . .

Kelsey

* * *

There's a rather unusual aviation personage out in Pittsburgh . . . name's **Hen Langer** . . . he's unusual because he has been up in airplanes 362 times but *has yet to make his first landing* . . . he's a parachute jumper and his "record" is the McCoy, all right . . .

* * *

The Civil Aeronautics Authority is startling the aviation industry with its sudden determination to enforce their regulations . . . we have just received a statement from the CAA concerning an airline pilot who violated several phases of the law, among them the continuation of a flight after he discovered that his airliner's de-icing equipment was not working . . . he flew on through icing conditions with his passengers and completed the flight, only to find the CAA awaiting him . . . he paid a $250 fine . . .

* * *

Here's a tip to a certain airline press agent who talks too much after eight too many drinks . . . stop "confiding" in people that you're going to get the job of the president of your company . . . your boss is one of the smartest men in the business—and he knows what you've been saying about him . . . it's because he's such a fine man that you've still got a job at all . . .

* * *

Short Brothers over in England having given their first "pick-a-back" airplane a thorough testing, now are said to be working on an improved version of the same idea . . . the "roosting" plane is said to be slated for a top speed of 270 m.p.h. and will be used on the London-Montreal service . . . hauling mail and express only . . .

(*Continued on page* 85)

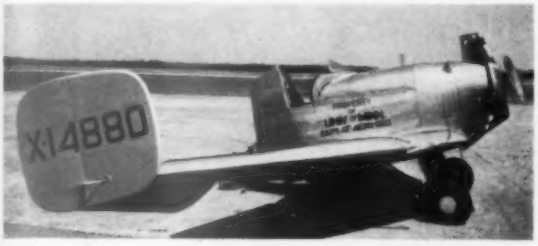
No fake, the above photograph is a remarkable action shot of a forced landing in the bay off the Naval Air Station at Pensacola, Fla. F4B-4's landing gear had been damaged in a landing. The pilot was ordered to land in water, only suffered wet feet.

HAVE YOU SEEN ?

The pipe protruding from the tail of American Export Airlines' Consolidated flying boat is for the dumping of gasoline in case of an emergency. An important safety factor on all flying boats, this pipe projects 4½ ft. from plane's tail, is insulated.

Army engineers at Wright Field secretly have been flight testing the new four-bladed propeller shown below on a P-36A fighter. Developed by the Curtiss company, the new propeller is controllable, is expected to boost airplane efficiency.

S. J. "Steve" Wittman, famed racing pilot, now is conducting tests on this lightplane which he hopes to place on the market.

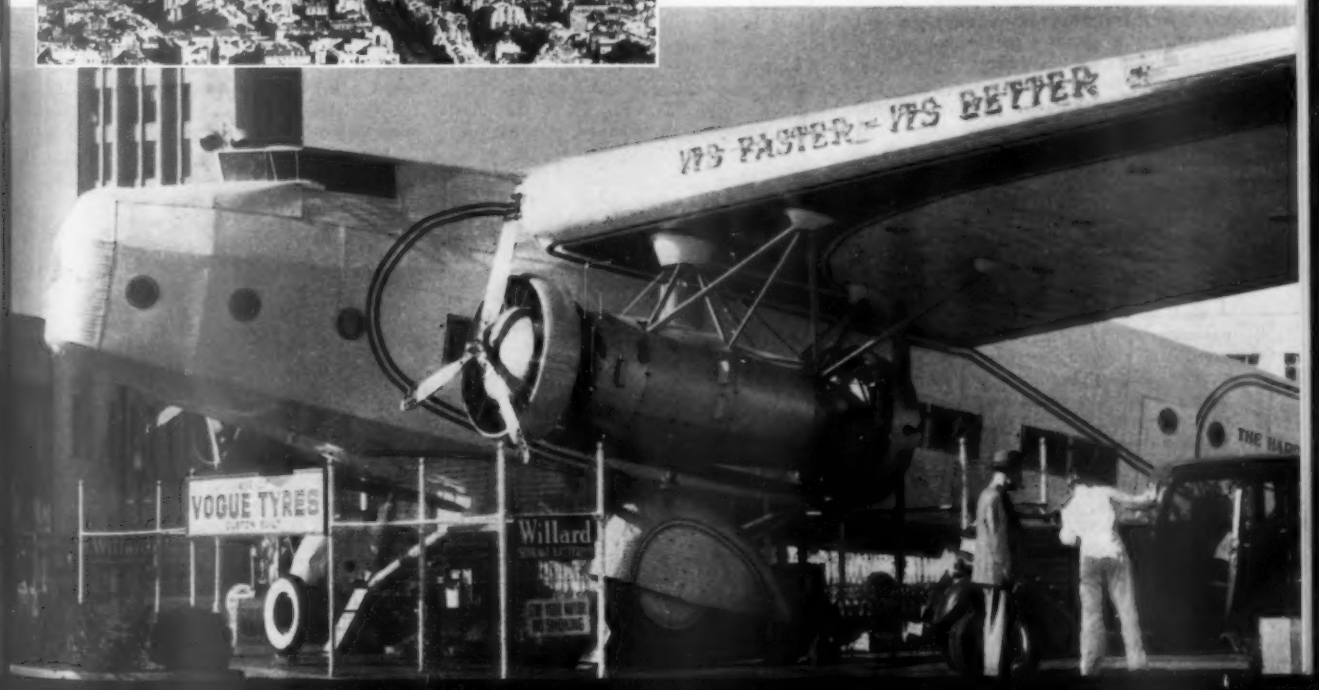


This unusual flying wing was built by University of Minnesota students, has slots, flaps, unusual controls, a 55 h.p. engine.

Above is the Ryan PT-16 trainer, a number of which have been ordered by the Army. The engine is a 125 h.p. Menasco.

At left is the first of a fleet of Liore flying boats to be used by the French transatlantic line from Africa to Brazil.

The once-famous Fokker F-32 (below) was a Los Angeles gas station until recently. It was unsuccessful as an airliner.



Novel Sailplane

A HIGH wing, semi-cantilever sailplane with unusual design features now is under construction at Aero I.T.I., Los Angeles. It is entirely a student project. The design was completed by engineering students and all parts are being made by students in master mechanics courses.

Wings of the sailplane do not follow the orthodox design, with ribs perpendicular to the spar, but have the ribs set at an angle. This results in the appearance of geodetic construction and gives greater strength at lower weight. The wings are fabric covered and the fuselage is all metal.

Another interesting feature is the wing flap design, never before used on a sailplane. The flap and ailerons are so rigged that when the flap is lowered the aileron also is lowered, to a proportionately smaller degree. This design is expected to capture the most efficiency from a thermal.

Specifications of the new plane are: wing span, 48.1 ft.; wing area, 170 sq. in.; wing loading, 2.65 lbs. per sq. in.; airfoil, 23012.7; aspect ratio, 13.6; estimated stalling speed 28 m.p.h.; estimated weight, 450 lbs.

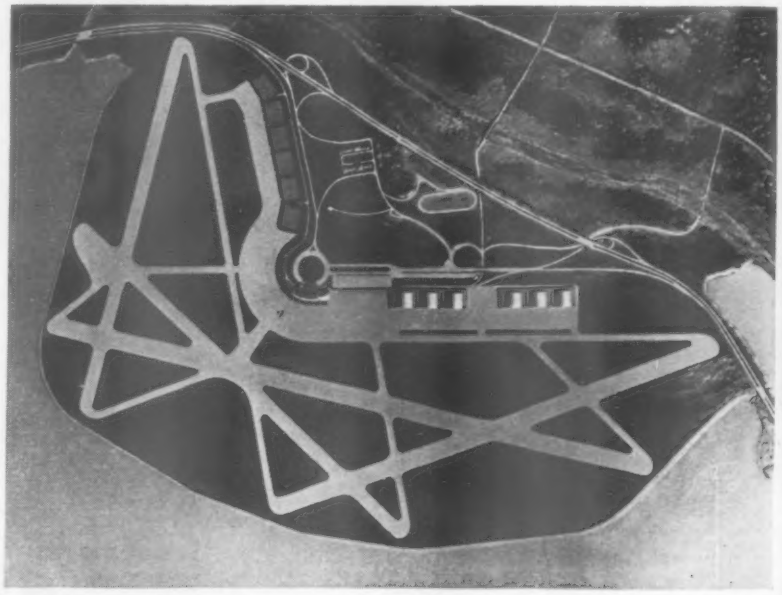
Crocodile-Proof

A NEW type of mooring-buoy which always floats in an upright position, even in the roughest water, and which never loses its balance, has been designed for use by the flying boats of the British Imperial Airways. The new buoy is of a hollow iron form of construction and is intended to replace rubber mooring buoys used previously at the marine bases throughout the Empire. At certain places in Africa and India it has been found that some types of rubber buoys have not had sufficient stability in a strong current. Another disadvantage has been that rubber buoys have been used by natives as practice targets for spears. At Malakal rubber buoys have been attacked at times and partially destroyed by crocodiles. On account of its unusual shape it retains a constant horizontal position on the water and consequently is invulnerable to native spears and crocodiles' teeth.

Service ! !

THE airlines offer a lot of service to their passengers but a United Air Lines passenger agent gallantly went far beyond the regulations to please a passenger the other day. An attractive young woman, waiting for the limousine to the airport, declared that she wouldn't leave unless the handsome young man back of the counter kissed her goodbye. The rest of the passengers were impatiently waiting, so he marched from behind the counter, fulfilled her wish, and the car rolled merrily to the airport with its happy cargo.

New Capital Airport



WHAT undoubtedly is the country's most dangerous airline terminal—Washington-Hoover airport at Washington, D. C.—seems about to go out of existence, at long last. The field that will replace it already is under construction at Gravelly Point, Virginia, not far from the nation's capital. The above photograph is of a model of the new terminal. It is easily seen that airliners now will have runways long enough to be in keeping with safety.

Airline pilots, particularly those of American and Eastern Airlines, have lodged continual complaints about the dangers of Washington-Hoover airport. Not only are that field's runways too short for maximum safety, there also is a heavily-traveled highway that cuts directly through the center of the field. Attendants have to stop traffic on this road while airliners take off and land.

An Italian Pursuit

MUSSOLINI'S very air-minded dictatorship has been responsible for many a new design in military aircraft. Italian manufacturers are continually turning out new models to be tried by their air force. The biplane pictured below is one of the latest pursuit biplanes to be produced there. This ship is known as the Ro-41 and is powered with a comparatively small engine, turning up only 390 h.p. It is intended primarily for maneuverability in serving as an air defense plane for the protection of Italian cities and industrial centers. There is nothing revolutionary about the Ro-41. It is built particularly light and only has a flight duration of two hours on its standard tankage. The ship is equipped with two-way radio and its armament consists of two standard machine guns synchronized to fire through the propeller arc. Top speed at 16,400 ft. is 201 m.p.h. while the maximum ceiling is 25,584 feet.

AIRCRAFT OWNERS AND PILOTS ASSOCIATION

AOPA NEWS

By GILL ROBB WILSON

THE Aircraft Owners & Pilots Association—long overdue—has just been born. You ought to see the kid! Healthy, happy, kicking the slats out of the cradle and already asking where babies come from. We call him AOPA for short. Got a connecting rod to teeth on and some of the neighbors' goats to play with. With 60,000 pilots as his godfather just watch him grow!

What's It All About

Well, to be brutally frank, everybody on the runway has a bandwagon but we of the great unwashed fraternity of common everyday variety of pilots. The airline pilots have their Air Line Pilots' Association and the manufacturers have their organization. The airlines have their Air Transport Association and the public has its NAA. Those organizations really serve their clientele. Who serves us? We've been eating off the kitchen table with the rest of the beggars—too long, far too long.

G. R. Wilson

But that's all over now and we're all set to go. Well financed, backed by some of the leading lights in aviation, the AOPA already has begun to win laurels for the pilots it represents.

Among Our Sponsors

There's a man named Bendix, for example, whose name is on most of the equipment to be found on practically every airplane. Then there's a man named Sikorsky, whose flying boats are known over the seven seas—though a bit beyond the purses of most of us plain folks. Then there's a fellow named Gannett who owns more newspapers than you or I can read, and Henry DuPont who has owned more airplanes than some of us ever saw. Hollywood, too, contributed its share with Ruth Chatterton and Brian Aherne. As a matter of fact, if you want to know anything about any of our 40-odd sponsors, just buy a who's who in America and look up the deep water citizens. And every last one of them is an aviator at heart. . . .

Among Our Officers

There's our president, Townsend Ludington. He was running a great airline without a mail contract before Mr. Black ever left Alabama. He and Bob Hewitt were racing old Sport Farman's when Jennie still was a respectable gal. He had to have some help in getting AOPA lined up so Philip and Larry Sharples, who run banks and factories and such-like, were drafted as vice-president and treasurer respectively. Alfred Wolf, of flying breakfast fame, runs the minutes. He's secretary. J. B. "Doc" Hartranft, Jr., former president of the Intercollegiate Flying Clubs, is executive secretary. Gill Robb Wilson, who flies because he's getting too old to walk, is executive consultant. They all own ships and they all fly and have for years.

Doc Hartranft is in charge of the organization office in the Transportation Building, Chicago. The good-looking secretaries are all married so no use dropping around, none of you pilots, unless you just want to see how hard Doc has to work—or if you have something on your mind. The Philadelphia office, where Mr. Ludington presides, is at 1424 Walnut Street. Now there's the place for hospitality; you'll feel better just for having met him. And Presidents don't have to work so hard either. And when in Philadelphia look up the Sharples boys. They are liable to ask you out for dinner and make you take a plunge in the pool that trickles out of the side of the mountain where they live. At least, that's what they say. But don't fall for that boloney; that water comes right out from underneath the North Pole! And, if you feel like crossing the Delaware River, come up to Trenton where Gill Wilson hangs out—when he isn't in Washington trying to get something done for the AOPA.

But We've Just Circled the Field . . .

Figured you'd want to look around a little before you landed. Mighty good idea. Gives a pilot a kind of homey feeling when he knows what he's sitting down on. The AOPA is a friendly sort of landing place. No brass hats, no big smoke stacks, no steam rollers on the runways. If you have soloed an airplane you can get in. That's what you might call being baptized into aviation, that solo requirement. So they made that the mark of eligibility. Of course, if you own or ever did own an airplane that lets you in also. AOPA figures a fellow's heart is likely to be where his dough is so that makes an aviator out of an owner. You see, the whole thing isn't just to have another organization in aviation, but to have an agency to gather up all the intelligence and faith and spirit that has been floating around loose and weld it into a great force for constructive progress in non-commercial aviation.

There's a whale of a lot of work to be done. Private aviation can't put that responsibility off on some one else. It's easy to sit around and bellyache. It's always been a favorite hangar sport to moan about something. The AOPA is the actuation force to mobilize miscellaneous pilots both to protect and promote their interests in an organized and aggressive fashion.

Work Already Has Started

For example, the civil pilot training program got stuck under pressure of work in the Senate Committee. Senator Bennett "Champ" Clark was chairman. His father used to visit Gill Wilson's dad, off and on. Old Champ was one of the real empire builders. His boy just has to be prime timber. You can always talk to a man like that, so Gill wandered in and asked respectfullike if he wouldn't do all us boys a favor by bringing up that bill for consideration. Didn't tell him a darn thing but that we thought it was sound and badly needed. Didn't try to do any lobbying. Didn't ask for any committments. Didn't get any either, but a wire came several days later saying he had called the bill up for hearing—and you know how swell were the results. Don't claim AOPA moved that bill at all. Merely telling you we were there and Senator Clark was perfectly swell about it. These Missourians can kick as hard for you as against you.

C. T. Ludington

Two other members of the Senate Committee were especially helpful: Senators Warren Barbour of New Jersey and Claude Pepper of Florida. Barbour once was amateur heavyweight boxing champion, so he's just naturally a good sportsman. And is that guy big! He wanted to know if the AOPA could get him a *Cub* with a *Cyclone* or *Wasp* in it for commuting to Washington. We told him we could fix that up all right, but it might be a better plan to get a DC-5 with a Continental "40" and then he could take all his friends along.

Things To Be Careful About

The Army carried the mail for a spell and washed out some pilots. That raised a lot of trouble. It happened because there wasn't time to get set for the job. We could wash out our training program the same way. There will be a lot of hitherto unconsidered factors to deal with. For example, the economic factor will be different. With someone else paying for the time, the student will want to pile up his flying hours and get through. He doesn't know that time is a maturing factor in flight training. He never has studied habit evaluation or, as the psychologists call it, maturation. We old timers learned about it by watching results.

Economic pressure will likewise be off the operator. He will be pushed to get all the hours handled. So what? So the student flies too much in too short a time without having time to mentally and nervously digest what he is learning. That leads to accidents or makes bad pilots. The Army and Navy know

this. They hold the boys back and so keep them keen and on edge.

We used to do the same thing on the front during the World War. Give a replacement a couple of weeks to stew around and get the feel of things till he was raring to get across the lines. Then take him out and nurse him for a few patrols till he was nervously adjusted to the job. Then you had a pilot. Some of those old heads like Eddie Rickenbacker, Harold Hartney and Weir Cook were past masters at it. None better than Reed Landis, Reed Chambers, George Vaughan and Bill Thaw. College or no college, brains are brains—and if you want smart pilots you have to be smart with 'em. The CAA training program has been a grand success so far and a pat on the back, Grove Webster! AOPA recommended to the CAA that, until research could be done on this matter, the amount of flight training be confined to one hour per day maximum, five hours per week, 15 hours per month and not more than a half-hour of aerobatics any one day—This until the student was past the 50 hour mark. Maybe the ante can be boosted or maybe lowered, but let's play 'em close to the belly till we find out.

Roger Kahn Has An Idea Worth Stealing

Roger in Long Island and Story Smith in Philadelphia substituted a manufacturer's flight demonstration of new ships, to replace the annual air meet at their respective aviation country clubs. Results were perfect. Good show by experts and good sales opportunity. Any interested pilot can try out any ship he pleases.

Tony Little Claims . . .

Only three of 47 sales who still don't have the new light ships they bought from Tony in the last 18 months. The reason may be that Tony sells aviation, not merely airplanes. This matter of certificate mortality needs lots of attention. AOPA is out to find out why *any* pilot ever gives up his license. It's popular to yell "over-regulation," but that's silly. We need simple, understandable regulation just as an army needs marching instruction. You can't play any game without rules and you can't win any game without team play. No, it's more fundamental things than weird regulation that cause pilots to quit. An excellent example of constructive effort on the part of pilots themselves is the increasingly popular breakfast flight. One such affair, sponsored by the Wisconsin Civil Air Corps, recently attracted more than 200 persons and 66 airplanes. Private flying functions like this are becoming more and more widespread and should be further encouraged whenever possible.

And So . . .

That's all for this month. Next month and every month you'll find us here sounding off more about AOPA activities. Until then, au revoir and don't forget—if you've ever soloed we want you with us. Just write to Doc Hartranft, Membership Headquarters, AOPA, Transportation Building, Chicago.

—Gill Robb Wilson.

Rearwin's Latest

THE trim little monoplane shown above is the newest model to come out of the Kansas City shops of the Rearwin Aircraft and Engine Co. Named the *Cloudster*, this new ship is powered with a Ken-Royce engine (built by the Rearwin company in either 90 or 120 h.p. class). The propeller is wood, with metal tipping. With a few exceptions, the new *Cloudster* closely resembles its preceding Rearwin designs. The NACA cowling which completely encloses the new model's engine is an enhancing addition. Specifications and performance figures listed by the manufacturer are interesting, although it should be pointed out that the reference sheet submitted to POPULAR AVIATION by the Rearwin company does not give an Approved Type Certificate number for the ship.

The 90 h.p. model has a top speed of 125 m.p.h., cruises at 110 and stalls at 48. Service ceiling is 14,000 ft. and the range is 675 miles. The 120 h.p. model has a top speed of 145 m.p.h., cruises at 125 and also stalls at 48. Service ceiling is 17,000 ft. and normal range is 625 miles. Span of each model is 34 ft. 1¾ in.

New Porterfield-Turner

COLONEL ROSCOE TURNER, famed airman whose article leads off this issue of POPULAR AVIATION, recently joined the Porterfield Aircraft Corporation as vice-president. The company since has changed its name to Porterfield-Turner. One of the first designs to be turned out by the firm under the new name is the Model 50 shown below. At this writing, this ship had not yet received its Approved Type Certificate.

The particular airplane pictured here is powered with a 50 h.p. Continental, though the company has announced plans to produce a 65 and 75 h.p. model in the near future. The Model 50 varies little from the basic American lightplane in this class. Performance figures given by the manufacturer list the top speed at 100 m.p.h. with a cruising speed of 97 m.p.h. Service ceiling is 14,000 ft., range is 250 miles on its gasoline capacity of 11 gallons. Two persons are accommodated in tandem and dual controls are standard equipment. Allowance is made for 30 lbs. of baggage. Wing span is 34 ft. 8 in., chord 60 inches and length, 21 ft. 5⅞ in. Weight empty is 617 lbs.; loaded, 1,100 lbs.

★ DEVICES FOR LANDINGS ★

by RAOUL J. HOFFMAN

Drawing by the author.

LANDING an airplane carries always a certain hazard, especially landing at high speed or landing in a small space. The landing or stalling speed is a function of the wing loading. If the wing area is fixed and the power loading is the same, the top speed always will be the same.

Increasing the wing loading, the top speed but also the landing speed will be higher. In order to obtain the original landing speed, high lift devices must be applied to the wing, or the wing loading must be decreased. The simplest method of reducing the wing loading is to increase the area when ready to land.

Section 1 shows how the increase is accomplished by telescoping wings that increase the span or the chord. Section 2 shows the designs of monoplanes that can be converted into biplanes by folding the top wing out of the fuselage or by splitting the wing into two airfoils. When using wings of very low aspect ratios the landing speed is low, but so is the climbing speed.

To increase safety in forced landings, parachutes are suggested to carry the whole airplane slowly downward. To reduce the weight of the parachute, only the cabin with its passengers should be saved as indicated in Section 3.

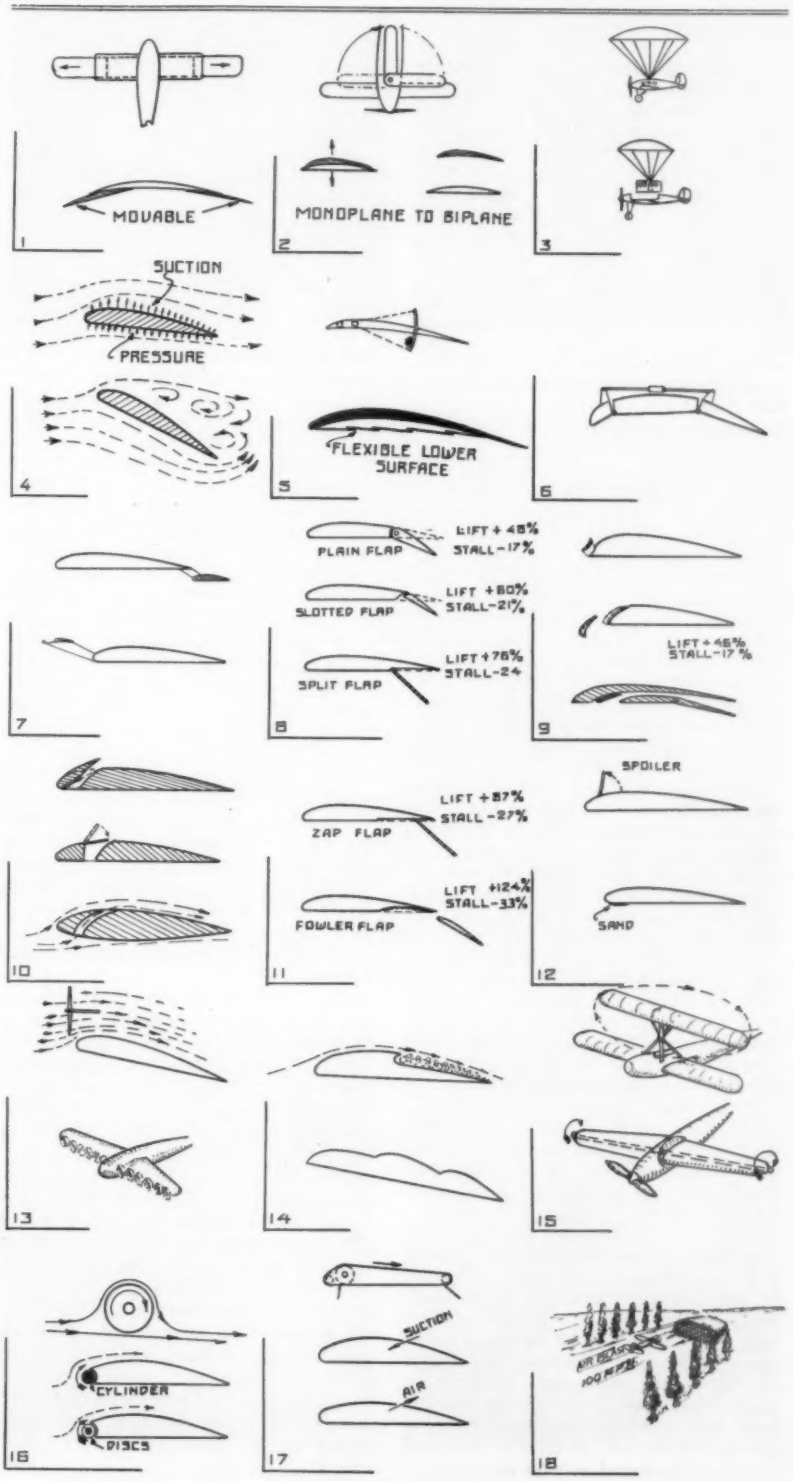
The effect of increased area can be obtained with simpler and lighter devices. In order to understand their workings, in Section 4 air flows are shown passing a wing at high speed and at stalling speed. It is obvious that to increase the lift the turbulency at high angle must be reduced by supplying additional air into the turbulent region, shaping the airfoil to conform to the airflow, or using guiding vanes.

The camber or curvature of the wing may be changed by a hand-operated crank and gear, or by letting the air pressure vary the flexible lower surface to the most efficient shape, thus emulating the nature of a bird wing. (Section 5)

Section 6 shows the alteration of the camber by simultaneously rotating the leading and trailing edge of the wing. The placing of auxiliary wings (slats) at the leading or trailing edge, as sketched in Section 7, will not improve the performance of an airplane except when their angles of incidence can be adjusted. To give the air a greater downflow the rear part of the wing is made rotatable. Section 8 pictures three distinct types of flaps: the plain flap without any air passage, the slotted flap with an air passage and the split flap that uses part of the under surface of a wing.

Very often the split flap has a number of slots not only for improved lift characteristics but also for greater strength. The figures given indicate the increase in lift and the decrease of stalling speed of the original wing section.

Guiding vanes, as shown in the upper picture in Section 9, were tested 25 years



ago with negative results, for the slats had reversed camber. A correct slotted leading edge design is depicted by the middle figure of the same section. A small airfoil, part of the outline of the wing, moves forward and downward as the wing reaches its maximum stall angle, adding extra lift at the crucial moment. Usually this is not very pleasant to some of the pilots who expected to land and had to float an additional distance.

The lower figure in Section 9 shows a combination of slot and flap. Section 10 shows three types of slotted leading edge designs. The upper figure depicts a very effective slotted leading edge that has the unbroken outline of the wing at high speed. The middle figure uses a flap for controlling the flow through the channel. The lower design is the simplest one and, if reports are correct, it will have universal applications.

The design is based on aerodynamic pressure distributions on the upper and lower surfaces at high speed. The slot is located at points having equal pressures at low angles. Thus, no air will flow through the slot. At high angles air will flow from the lower surface to the upper, thus increasing the lift and decreasing the landing speed without a moving part.

Section 11 gives two designs of flaps that are not only rotated but moved past the trailing edge. The Zap flap uses the lower part of an airfoil and the Fowler flap conceals a whole airfoil within the main wing. Without any other combination the Fowler flap gives the greatest increase in lift.

Gliders with their low sinking speeds do not require any high-lift devices or any decrease in their landing speeds. Nevertheless they use spoilers to increase the sinking speed. These add drag to eliminate the floating length before landing. Spoilers are usually placed at the leading edge of the wing as sketched in Section 12.

Once in a while some improvements on wings are demonstrated that are contrary to aerodynamic teachings. Usually the investigation shows that the section used is inferior to sections available. It is easily proved with a poor section that gluing sand on the lower surface (Section 12) will increase the maximum lift coefficient.

The slipstream of the propeller may be used to increase the maximum lift of the wing by placing the propeller above the wing as sketched in Section 13. Usually, low-wing monoplanes take advantage of the slipstream, which is the highest at landing. But the reduction in landing speed is only a few per cent.

The lower sketch in Section 13 shows the idea of a famous airplane designer who thought that placing a great number of propellers on the leading edge could make the plane hover.

Another idea illustrated in Section 14 which has a certain theoretical background is to remove part of the upper section of an airfoil and the airstream should have less resistance over the created vortices than over the surface of the upper structure. In the same section an airfoil with a triple curved upper surface is shown which was supposed to increase the lift three times. Wind tunnel tests, however, gave a 100 per cent increase in drag and

(*Continued on page* 87)

The Windshield Problem

by F. F. Blagg

IT is an oft-repeated maxim of Mark Twain that everybody talks about the weather but no one does anything about it. In a similar vein, aviators have long discussed the subject of poor vision from their windshields in stormy weather, but now the National Advisory Committee for Aeronautics has done something about this problem. As a result of studies in a wind tunnel, the pilot's vision of the future will be improved and at the same time raindrops will be deflected from the cabin of the plane.

The principal factors to be considered in designing a satisfactory airplane windshield are: Provision for adequate vision in all important areas in the available field of view; provision for opening a portion of the windshield to provide maximum view in stormy weather; consideration of the comfort and ease of the pilot in making use of available vision; and keeping the drag of the windshield at a minimum. In short, to be satisfactory an airplane windshield must give an adequate field of view entirely unobstructed by glass and yet not permit wind or rain to enter the cabin.

Because of the variety of design in planes no present windshield arrangement could be considered as representative and, therefore, a number of conventional types were tested under full-scale conditions. Since there was no general information applicable to the subject, detailed study was made of the flow of air and rain about each windshield arrangement and systematic changes were made to improve the vision that could be obtained in stormy weather from each one. These wind-tunnel studies, conducted at Langley Field, Virginia, aided materially in developing a design of a special windshield that seems to have exceptionally promising characteristics.

As a preliminary step in the evolution of a suitable windshield design, a study was made of rain-drops and the fashion in which they strike the windshield. In this study the speed of the plane, the size and rate of fall of the rain-drops, the interference effects of the fuselage ahead of the windshield, and the general form of the windshield proper were all considered. The rain-drops were classified into three types: (1) direct drops, or those that head for and enter an opening directly at high velocity; (2) indirect drops, that first hit on the windshield and then are carried into an opening at a low velocity by air-flow, and (3) splash drops, or drops that strike the edges of an opening and splash inward. All three types of rain-drops must be eliminated by a successful aircraft windshield.

Following the classification of rain-drops further study, based on meteorological data, was made concerning the frequency, size and rate of fall of rain-drops. From this, and other data, was computed the path of rain-drops with respect to horizontal flight, without interference effects. Air deflection was also computed as a means of determining the feasibility of using air deflectors ahead of a windshield to prevent rain-drops from entering an opening.

Having worked out these formulae on paper, the engineers of the National Advisory Committee for Aeronautics set to work to test their theories. A plywood-covered fuselage was built which would lend itself to various windshield constructions. The cockpit was sufficiently large to accommodate an observer and the structure was mounted in the 7-by-10-foot open-throat wind tunnel with the fuselage base at the bottom of the tunnel throat. In this position the windshield was nearly at the center of the air-stream.

Rain conditions were simulated by a water-spraying jet mounted about 10 feet ahead of the windshield. This arrangement provided a spray of water from a point source and could be so adjusted as to give drops of any required size from fine fog particles to drops about 0.12 inch in diameter. Inside the fuselage were controls for shifting the source of the spray and thus the complete path of the drops from any position with respect to the windshield could be observed. Where a more detailed observation was desired a small portable hand-spray was used.

To obtain the speed and direction of the airflow about the fuselage and windshield a velocity meter of special design was used. This instrument has two advantages over an ordinary pilot tube in that the measurable velocity head is more than twice as great and the proximity of the two openings in the tube affords greater accuracy when the velocity gradient is extreme. The instrument was calibrated in an air stream of known velocity, this velocity usually being about 65 m.p.h.

The approximate direction of the airflow was determined by a small silk streamer mounted on the end of a fine wire. An adjustable opening was built into the extreme front of the nose of the fuselage to permit regulation of the fuselage static pressure, this pressure being measured by a standard type manometer.

Deflection of rain and wind from any windshield opening may be obtained by means of airflow, guide vanes, or both. The first method may be accomplished by the shape of the fuselage in front

(*Continued on page* 64)

Personalities

J. H. Kindelberger, head of North American Aviation, recently got honorary Polytechnic Institute of Brooklyn (N. Y.) degree.

F. Handley Page, famed British manufacturer, recently passed 30th business year.

World's only father-and-son pilot team are Ernest R. Basham (left) and Ernest, Jr.

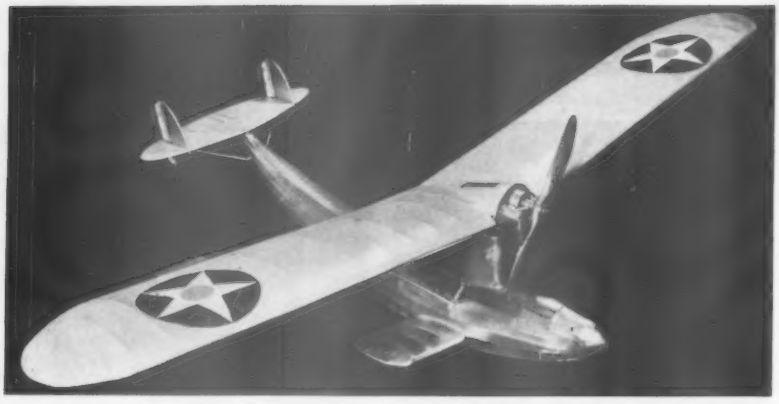
Lieut.-Comm. Sam L. LaHache (center) recently led 15 Navy bombers to Hawaii. →

Donald Douglas (left) and father celebrate Douglas company's 25th year in aviation.

Jacqueline Cochran (left) is shown receiving Harmon Trophy from Mrs. Roosevelt

World's only woman airline meteorologist is Fern Kirkman, 23, of American Export.

The Fowler W. Barkers recently attended California airline engineering meeting.



This unusual gas model should give its owner many interesting seaplane experiences.

THIS MONTH'S MODEL

by PAUL W. LINDBERG

Model Editor and Designer

THIS novel little flying boat will give you many thrilling hours of pleasure. We do not believe there is any finer sport than flying a model from the water. One thing one must bear in mind when launching his model from the water is that it is more difficult than land plane flying. Model built from the plans presented here may be had by enlarging the plans four times over the size shown. This may be accomplished with an ordinary pair of dividers.

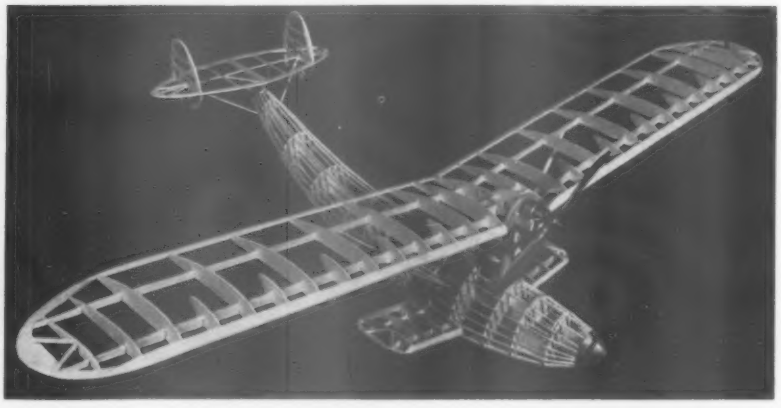
Color scheme: Fuselage and hull, dark gray. Upper side of wing panel, United States Navy yellow. Lower side, silver. Elevator and rudder, gray. United States insignia used throughout.

Construction

In building the hull, 1/8-inch balsa sheet is used for the main rib. To this is attached the various formers. The builder will find this type of construction fairly simple as well as possessing a great deal of strength. After all the formers and nose plug are cemented into position, the stringers are next attached. Please note that the stringers are cemented on top edges of formers with no notches in formers. This accounts for the smooth papering job shown in finished photo of the model. Two trap doors are built into the hull for ignition purposes.

The cabane section is next built into the hull. See that this is strongly reinforced as a great deal of strength is absorbed at this junction.

In constructing the wing, build the left and right wing panel separate and cement together at center ribs after they have been finished to form the proper dihedral angle. All ribs are cut from strong 1/8-inch sheet balsa. Shape and sand leading and trailing edges carefully before they are cemented to the ribs. One-eighth inch sheet balsa wing tips are used throughout. A few 1/8-inch square balsa diagonal compression struts may be cemented into the wing panel to add further to their strength. These, of course, are not shown on the plan and may be added if so desired. Note: center of wing carries the firewall and motor mount. See that these are cemented in strongly.



Somewhat out of the ordinary is the fuselage construction of this novel seaplane.

Construction of the elevator and rudders are of the flat section and all very simple to construct. It is very important that these be pinned to a flat surface when shrinking as they have a tendency to warp out of shape.

Details such as installation of motor, batteries, coil, etc., are clearly shown on the plan. Please note that the only batteries necessary are two small flash light pen cells. These are bound together with Scotch cellulose mending tape. The wire sections are held in place with this same tape. After the model has been completely finished, these batteries are tapped within the hull at the proper balancing point.

In covering the model, a great deal of time should be taken as this will be a vital factor in the success of the model. Many a fine model has lost its excellent workmanship by a poor covering job. In covering the hull, we advise the builder to cover only one to two stringer spaces at a time. By this we mean not the entire length of hull. The bottom of hull should be covered with two layers of bamboo paper in order to obtain the required toughness. In papering the bottom, shrink with water, allow to dry and give two coats of clear dope with a light sanding between each coat. Apply a second layer of bamboo paper, then repeat the procedure.

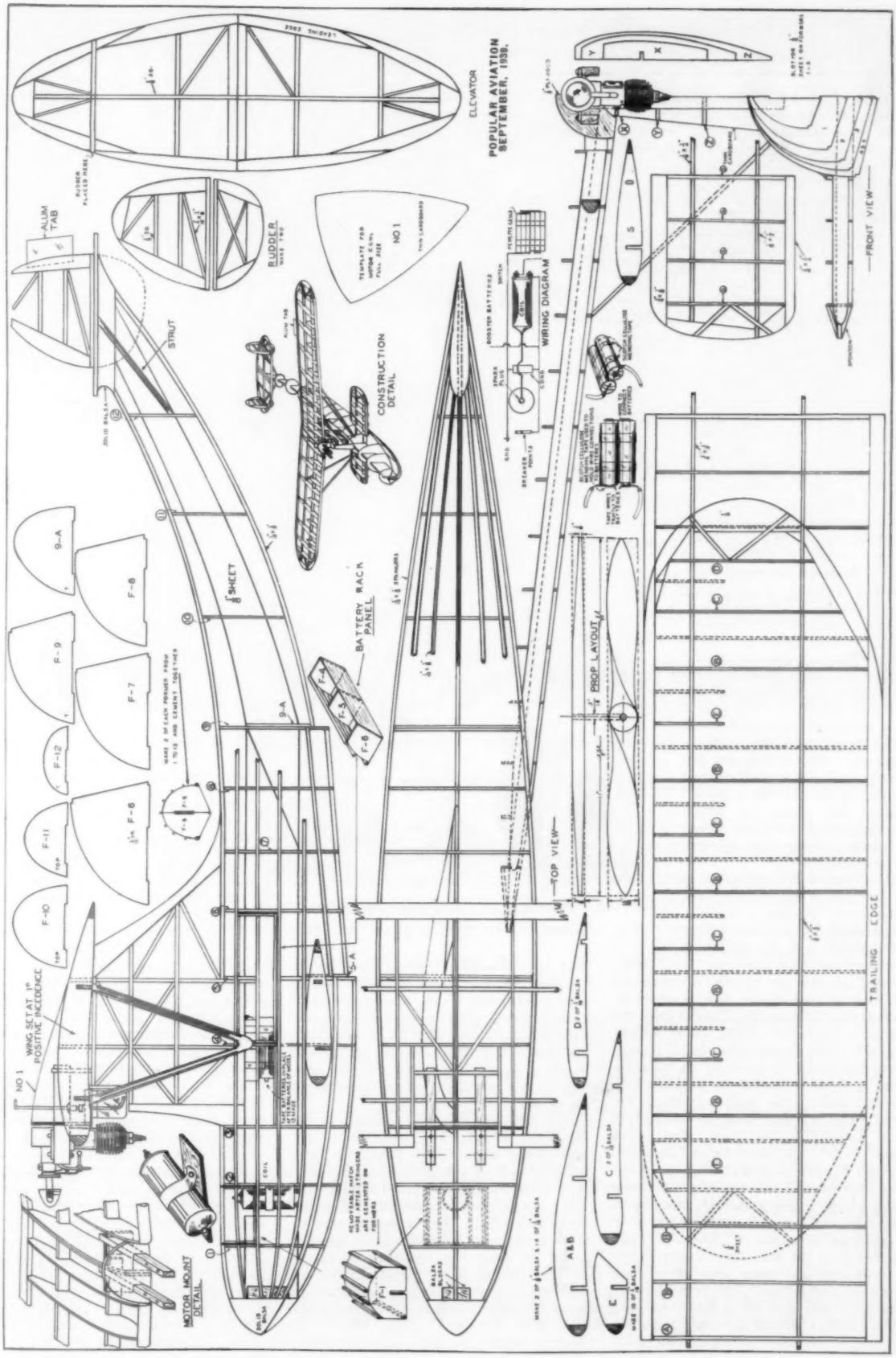
In covering the wings, each panel may be covered with a single sheet with the exception of the last rib to the wing tips. Make sure bamboo paper is cemented to every rib on the bottom side so as to gain the efficiency of the cambered section. Sponsons should be built and placed in exactly the same position as shown on plans. These are also covered with two layers of bamboo paper on the bottom sides. All parts are shrunk by applying a light coat of water. Allow this to dry until paper becomes taut. Two to three coats of clear dope are next applied. For a smooth finish give a light sanding between each coat.

Colors are next applied, as well as all details shown in the plan. Aluminum tabs on the wing and rudders will give lateral and directional control. Make sure model glides, on an even keel, gently to the ground before attempting to launch it. Keep all wires covered with a thin coat of wax and framework of hull should be varnished or doped before covering.

Any removable hatches should be sealed up tight with Scotch cellulose mending tape so as to prevent water coming in contact with the wiring and batteries. This tape is easily removed when checking and installing new batteries and also is waterproof. This mending tape may be secured from any dime store, drug or hardware store. Make sure that it is genuine Scotch cellulose mending tape, as other substitutes will not work.

If the finished model does not balance properly, weight may be added to nose through the front hatch. Be careful in launching the model from the water. Head model directly into the wind and attempt only short hops at the beginning.

END


POPULAR AVIATION
SEPTEMBER, 1938.
ELEVATOR
RUDDER
STRUT
CONSTRUCTION DETAIL
WIRING DIAGRAM
BATTERY RACK PANEL
PROP LAYOUT
TOP VIEW
FRONT VIEW
TRAILING EDGE
MOTOR MOUNT DETAIL
WING SET AT 1° POSITIVE INCIDENCE

The Case for the Naval Aviator

(*Continued from page* 17)

puny grasp of the subject, and, in self-defense, become petty dictators. They could well learn from below, but it is simply out of the question to be educated by inferiors in rank, once they have left Pensacola.

Their lack of foresight often brings pathetic results. The 1938 war games is a case in point. Complaints had been received prior to their outset that pilots of the big patrol bombers were being required to operate the airboats for such long periods without sufficient sleep that their physical condition was endangered.

The responsible officers, comparative newcomers from Pensacola, presumed to know more about the situation than the men who had to put up with the prevalent defects in it. They ignored the warnings; in fact, grew irascible because they were called to their attention. The inescapable catastrophe occurred — with such dramatic, startling effect that the nation was shocked.

The war games were in full progress off Hawaii. The Pearl Harbor airboat squadrons were in the thick of the mock battles to defend the Islands. Late on March 29, 1938, the bombers returned from a 13-hour flight mission that had every man keyed to a nervous peak. Instead of being allowed to recoup spent strength by resting in quiet quarters, the flyers were informed that, with short notice they might have to take off again. War conditions had to be met—and a good record chalked up for the "desk pilots" because the planes in which they themselves probably would be helpless, made such splendid performances.

Sleep was hardly possible in the hangars where the haggard pilots were ordered to remain. Planes were being checked over and refueled in a riot of sound. Six hours of this kind of "rest" were allowed the aviators before they received the order to take off into the treacherous, dark dawn of March 30. Fatigue rode the control rooms of the huge, heavy bombers. To make matters worse, a terrific storm had reduced visibility to virtually zero. And, as if to seal the invitation to self-destruction, the high command ordered radio silence, robbing the pilots of a navigation aid that might have helped relieve a doom-laden situation.

What happened is well-known. Soon after the takeoff one of the bombers, flying blind, either smashed into one of the Oahu cliffs or fell out of control in an attempt to avoid it. The wreckage was found in the surf near Kaena Point. A second airboat never was heard from after the departure. Its possible last position could not be learned because of the radio silence, banning such reports. The stormy weather and pilot fatigue helped clinch Death's argument. Eleven were killed, sacrificed to lax administration and ignorance of actual flight conditions.

The court of inquiry whitewashed the entire regrettable setup. The incident was considered one of the "normal risks" assumed in aviation duty.

One of the responsible officers referred to above once before had registered a claim to Naval fame while on surface duty. He awoke one day to discover the word "Madhouse" painted on the side of his ship.

When a rank and file Navy flyer sees an officer step right out of Pensacola into command of an aircraft carrier, without the remotest knowledge of flying a plane on and off a flight deck, he is bound to become discouraged and embittered. This has actually happened.

"That's Charley's boy, home from aviation school to help out with the plowing . . ."

And selection boards always will be the bane of Navy aviators as long as they pass over men whose ability to fly is unquestioned, and promote others who need a magnifying glass to observe their instruments, but are on the right side of the political fence and did not commit the fatal error of concentrating solely on aviation.

The magnifying-glass example is not fictitious. We know of one officer, who took flight training at Pensacola, who actually carried a large magnifying glass on a cord around his neck during flights. His young instructors were dumbfounded when this officer (he's a commander today) pulled out his magnifying glass in order to read the instruments in his cockpit during blind flying instruction! Yet today, that officer is a high-ranking Naval "aviator" and holds an important and vital position in the Navy's air force—despite the fact that his instructors flunked him in certain phases of his flying course. This officer, like dozens of others whom the Navy Department decided *must* have aviation ratings whether good, bad or indifferent, was simply "railroaded" through the flight course. In this way, the Navy attempted to cover up its lack of high-ranking officers in its aviation branches.

Once in a while situations like this bring home the ineptitude of some of the high command. But much more tragic is the spirit of stagnancy, the fear of experimentation, and the slow acceptance of the *different*, that marks Naval air administration by men fundamentally not aviators.

Men are sacrificed and equipment is destroyed because of this stay-in-one-place complex. A recent, vivid example of this was the crash of nine planes and death of two student pilots on a night training flight between Pensacola and Atmore, Ala. On the return from Atmore, fog rolled in from the Gulf of Mexico, enveloping the three sections. The students, unfamiliar with this kind of emergency, became panicky. They flew around aimlessly, most of them eventually abandoning their ships and leaping with parachutes. Two who stayed in their planes were killed. The experienced instructors knew that the safest course was back to the Department of Commerce field at Atmore. They had radios in their planes but the students had not. The simple instruction "Return to Atmore" would have saved two lives and nine planes. A $150 radio set in each of the students' ships would have prevented the disaster. Perhaps just an oversight, more likely lax administration.

When an aviation cadet several weeks ago plunged to death from 25,000 feet, apparently because he fainted either due to a defect of his oxygen apparatus, or because the tube slipped from his mouth, attention was centered on the Navy's archaic oxygen equipment. The next war is likely to be fought in the substratosphere, yet Uncle Sam's Navy flyers are training for it with cumbersome, obsolete apparatus that detracts from the attention the pilot must give to the manifold details of operating a plane and manipulating a gun at the same time. Even some commercial airlines have adopted the more up-to-date oxygen mask, with nose or mouth-breathing optional and in no event as difficult to use as the Navy's present equipment.

At long last the Navy has decided on the purchase of Link trainers, generally recognized as one of the most effective media of preparing a pilot, on the ground and in safety, against the contingencies likely to occur in the air. And at North Island, the Navy's largest aviation base, where hundreds of aviators are in constant training, there is exactly one Link trainer. Yet all major airlines as well

(*Continued on page* 84)

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COUNT THE CUBS THE WORLD'S FASTEST SELLING AIRPLANE

Youngstown Shows Them How

(*Continued from page 31*)

want to fly for a profession because I've already got a good profession—and it is too expensive to fly as a hobby."

That set Seidner to thinking. Here was, decidedly, something wrong. Here was the type of men Uncle Sam would like to coax into the air—and they felt they couldn't afford it.

And yet experience with his own flying school equipment had proved that it is very inexpensive to fly light airplanes—provided you can keep them constantly in use to spread the depreciation costs thinly, and can avoid crack-ups and minor mishaps. It is the hangar rent and the long waits between hops—for depreciation and hangar rent, like the tides, roll relentlessly on—and the broken props and damaged wing tips and worn out parts that run up the costs of privately owned planes.

"A flying club!"

The idea popped into Seidner's mind—and was almost abhorrently discarded. But not quite.

Now there's nothing particularly new about the flying club idea. The flying club has been with us for years—and in disrepute for years. Of course, there have been some very fine flying clubs—but chiefly bad ones. Usually the flying club, in the past, had ended up with a cracked-up airplane, perhaps a fatality or two, a group of disgruntled members, a large deficit—and a black eye for the aviation business. The faults, carefully analyzed, usually resolved themselves down to lack of supervision and control, petty jealousy among members, lack of co-operation and the wrong type of members.

So Seidner, forewarned by the fate of so many clubs and forearmed with his knowledge and experience gained from operating light planes and keeping cost accounts, worked out plans for a flying club—one that would not fail due to accident, jealousy, lack of co-operation or supervision.

He broached his plan—a plan which would enable 20 members to learn to fly at much less than half the usual cost—to the Junior Chamber members.

They received the idea dourly at first, with lack of enthusiasm—for Youngstown was, surprisingly, one of the most unair-minded of cities. Wives objected, financial reasons intervened and there were countless business reasons in the way.

But Seidner, aided by Eckert, plugged doggedly on and finally they got a break. The idea took hold, clicked. Quickly, 20 members—20 carefully selected and scrutinized members—were enrolled; 20 men of whom only three had ever flown before. The club bought a Piper *Cub*, equipped with a 50 hp. Franklin engine, and instruction under Seidner's tutelage began. Then enthusiasm really waxed hot. Members started in enthusiastically to learn to fly. They brought their friends and their friends' friends—and interest grew tremendously.

Surprisingly enough, the club's affairs are working out exactly so far to the specifications Seidner had set up on paper. Every member got his student pilot certificate; every member has soloed and is well along toward his private pilot certificate; the club already has salted away a few hundred dollars into its reserve fund and it has added tremendously to the Junior Chamber's prestige.

No wonder other members are privately kicking themselves for passing up the opportunity; no wonder the members are scrambling for admission to the second club and no wonder Junior Chambers elsewhere are joining the movement. And no wonder the idea has worked into a first class business venture for Seidner.

"This directional beam finder keeps finding things it shouldn't . . ."

The whole secret of the flying club's success, of course, is safety, absolute safety—and Seidner is satisfied that the whole secret of absolute safety in a flying school is careful selection of the men to be trained, careful training, careful supervision, good airplanes and good maintenance of those planes. He is banking his business future on that.

"Just one crack-up," said Seidner, "would be enough to ruin my business reputation and my business—and it has taken five years to build them."

Seidner brags about quite a unique safety record for his flying service. Operating four or five ships out of a tiny handkerchief-size two-way field—a field that is a marvel of all air experts who see it—Seidner has carried thousands of sightseeing passengers and has taught over 200 men—among them a one-eyed man, a one-legged man and a Negro—to fly. He and his students have piled up many thousands of hours—at least 1,500 to 2,000 hours a year—on his ships in that tiny field in the last five years without a single forced landing, without even scraping a wingtip, or breaking a prop.

A safety record to shoot at! And the Civil Aeronautics Authority boasts of its 4,500 accident-free hours in the college student training program! "Of course," admits Seidner, "one doesn't achieve such a record by accident. Sooner or later, chance catches up. It is achieved by hard work and continuous vigilance—continuous checking of airplanes and motors to find the flaws before the wings come off or the motors quit and to be sure that gas tanks are kept well filled; continuous checking up on cocky and reckless students; continuous checking up to insure that every pilot on the field is familiar with the regulations and is fully prepared for the time a forced landing may come."

Seidner, from careful study of his cost accounts for years, had determined for the club that 20 members—no more and no less—could buy the plane, learn to fly and get sufficient experience within a year's time to qualify for private certificates at a cost of only $182.60 each—including $10 for the CAA medical examination and complete insurance with the expectation of getting back $50 to $75 when the club's assets are liquidated at the end of the year—provided the safety record is maintained.

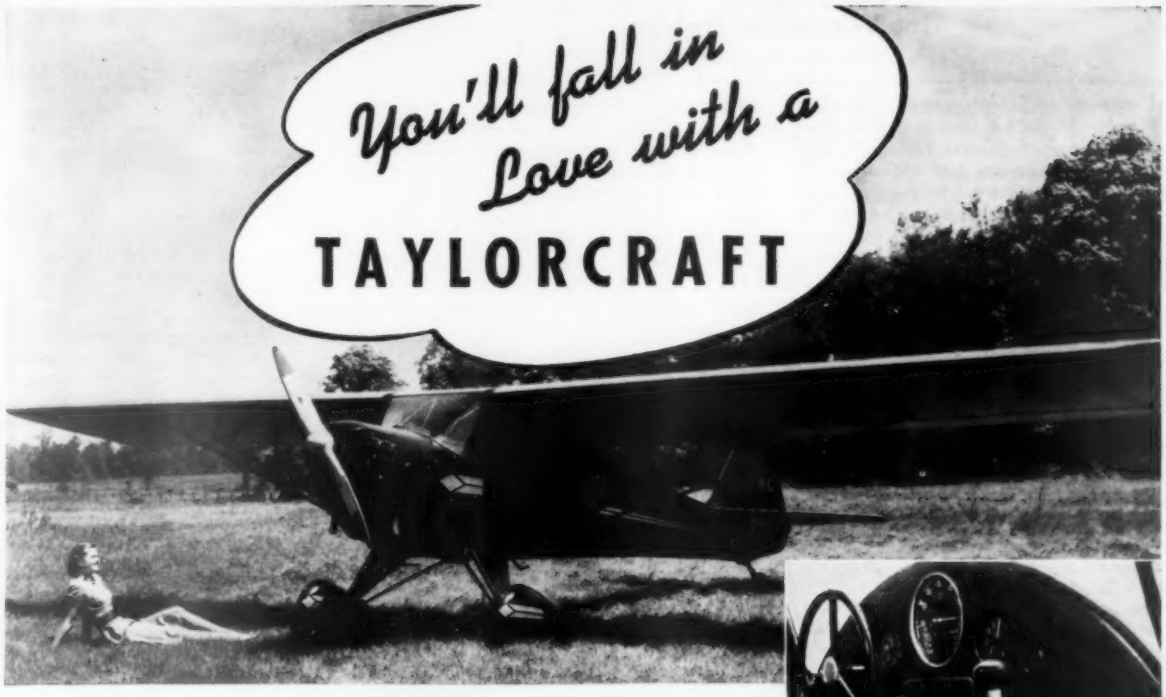
It costs $284—$8 an hour for eight hours of instruction and $6 an hour for 35 hours of solo—without the insurance protection or the chance of the "kick-back" to learn to fly on the same type of airplane otherwise.

Here is how the Junior Chamber club plan works out on paper—and as it has actually worked out:

Each member's share of down-payment on ship costing $1,295	$22.00
Monthly dues of $4.55 to meet monthly payments on ship	54.60
One twentieth of annual insurance premium	7.50
Eight hours of instruction at $3 per hour	24.00
43 hours use of plane at $1.50 per hour	64.50
Medical examination	10.00
Total	$182.60

Experience has shown the ship uses only three gallons of gasoline per hour—66 cents worth at 22 cents a gallon—plus a few cents per hour for oil, hangar rent and repairs, making operating costs

(*Continued on page 78*)



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Learn to Fly in the Plane You'll Want to Buy

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The Windshield Problem

(*Continued from page* 56)

of the windshield, the shape of the windshield itself, or by forcing air outward through the windshield opening. Preliminary calculations had indicated that guide vanes might be necessary to deflect direct drops while air deflection might be used to eliminate the two other kinds of drops, especially with front-opening windshields.

Therefore, a study was made of the two methods, using about six different windshield types. Each type was tested with various frontal openings designed to give maximum field or vision in a forward direction. First, a thorough study was made of the airflow about the fuselage and about each type of windshield in the closed position. Further test included surveys of both airflow and rainflow using various windshield openings in connection with a number of special additions such as deflecting vanes, gutters and static-pressure variations. It was found that an airfoil with a section similar to the Clark Y was most effective and such an airfoil was used in all the tests employing deflecting vanes.

The first type of windshield studied was a representative of the vertical, flat-front type of ordinary dimensions. The front window was 7½ inches high and 21 inches wide. Two other forward vertical windows were built at an angle and intersected the front window. Observations and tests showed that the only practicable opening would be one not less than 1½ inches in width, extending across the window. However, both wind and rain entered the cabin and increasing the static pressure in the fuselage prevented only the indirect and splashdrops from entering. To eliminate the direct drops an airfoil having a chord of six inches was mounted about two feet ahead of the fuselage. This inverted airfoil in combination with a two-inch ledge along the lower edge of the windshield prevented about 95 percent of the drops from entering. Under these circumstances the opening could be increased to two inches and a vertical field of view of about 10 degrees in a forward direction and a total vertical field of view of about 28 degrees were available although about four degrees were blanketed by the airfoil.

The next windshield was a rearward-sloping, flat-front type of ordinary dimensions. The front window had a rearward slope of 136 degrees, a vertical projected height of 7½ inches and a width of 21 inches. Two sloping side windows were set at an angle with the front window. The results of experiments with this windshield showed that the most favorable conditions were brought about when the front window was split horizontally and the upper and lower sections hinged at the top and bottom, the top of the opening being near the top of the rearward slope. An outer ledge was added to the lower edge of the windshield and an inverted airfoil mounted about 2 feet ahead of the opening. This arrangement afforded a field of vision similar to that obtained from the opening in the first windshield.

In a plane of similar construction the fuselage and windshield were faired to form an open slot. Although the flow of air over the combination was fairly uniform, tests with the spray showed this arrangement to be unsatisfactory.

"Oh, that's just Walter and his new all-retractable airplane . . ."

An airfoil was then mounted on the forward fuselage, and when set in a position to intercept the direct rain-drops no water entered the cabin.

Experiments with forward-sloping flat-front windshields of ordinary dimensions showed that a section of the front window well above the center line and 2¼ inches wide provided the best place for the opening. The section was swung outward and fixed to form a ledge along the upper edge of the opening. The inverted airfoil was then located about 30 inches ahead of the opening and the static pressure in the fuselage was raised. No rain-drops of wind entered this opening while a vertical field of view of about 10 degrees in a forward direction was allowed. Considering a four inch vertical movement of the pilot's head,

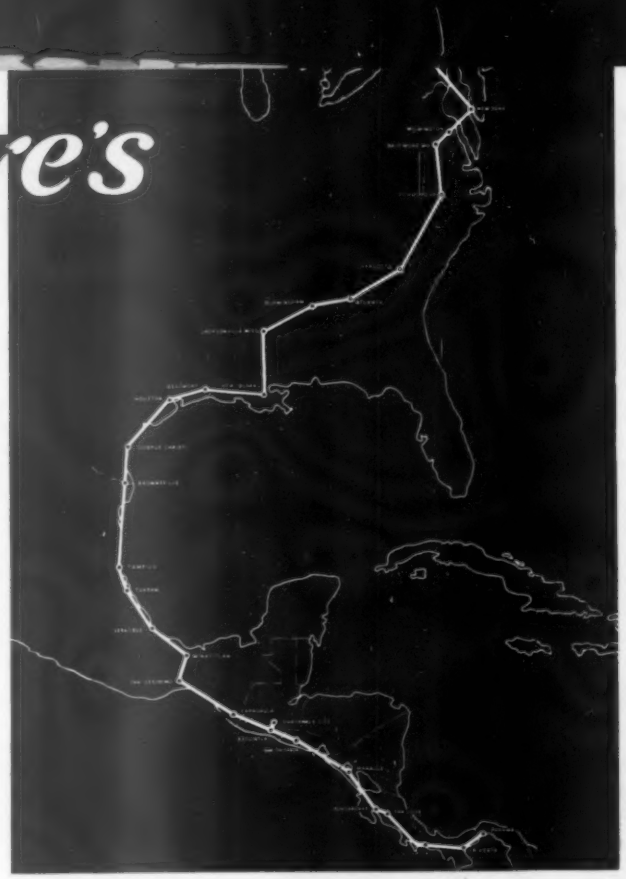
The next type of windshield studied was a rearward-sloping V-front type. The vertical projected height was 7½ inches, the included angle of the V was 100 degrees, and the front panels sloped backward from the base at an angle of 50 degrees with the horizontal. Tests indicated that this type offered a much lower blocking effect and produced much less resistance to the air-stream than any of the previous types. Neither the style of opening employed with the other types nor the use of a simple airfoil for deflection purposes was found to be readily adaptable to this type of windshield. The most satisfactory arrangement for preventing the entrance of raindrops was found to be a protruding, streamlined celluloid shield constructed about an opening in the windshield panel. This shield formed a single curved surface with its elements horizontal and approximately perpendicular to the path of the airflow along the window. The front portion of the shelf extended sufficiently outward to protect the entire opening from direct drops, while a gutter completely around the guard eliminated any indirect water carried in. The opening was 8½ inches long with a maximum width of four inches, affording a maximum field of view of about 20 degrees to the left from straight ahead.

Because of the successful performance of this combination a windshield was built to provide a large open area on either side. The lower front edge of a celluloid sheet was attached to the fuselage surface forward of the cabin. The sheet was then bent over and fastened to the curved roof at the top of the cabin. The outer edges were cut inward toward the front so that the front of the shield, did not extend entirely across the front of the cabin, thus providing some forward vision.

This shield was highly satisfactory in eliminating direct raindrops, although indirect and splash-drops entered in considerable quantities. Tests employing various guards, gutters, and guide vanes failed to overcome this condition. However, as far as it went the shield seemed to be a simple solution to a difficult problem, so further studies were made employing side-opening arrangements that would retain the direct drop and at the same time diminish the turbulence near the opening, which carried in the indirect drops.

Therefore, the design of the windshield was changed. The height was increased from 7½ inches to 13 inches and the forward part of the fuselage was cut away to give a more rounded nose, which was faired smoothly into the base of the windshield. A vertical V-type windshield was used, since this type was found to deflect most of the oncoming air to the sides. The outer edges of the V were curved inward to reduce local turbulence at the openings which were located immediately back of this part on either side. Some directly forward vision was allowed and a panel at the rear of the opening served to fair the device into the sides of the fuselage.

(*Continued on page* 74)



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John C. L. Adams of Bismark, N. D. and his Franklin-powered Taylorcraft 50.

***For further details of Mr. Adams' flight send for copy of FRANKLIN FACTS for July.*

AIRCOOLED MOTORS CORPORATION
SYRACUSE, NEW YORK

I Learned About Flying From That . . .

(*Continued from page* 21)

Ball we had just seen Captain Eddie Rickenbacker introduce "Miss American Aviation for 1939," when "Red" Hulse, my wing-mate, called me aside. "Say, this committee means business!" he said. "I think I'll get a little sleep tonight, just in case!"

"Not a bad idea," I agreed. "It looks pretty hopeless, but you never can tell!"

So we slipped away from the party and turned in, which was a wise move, for it probably saved my life the next day.

Sunday was bright and fair, ideal weather which brought out the largest crowd that ever attended an air meet. On arising, we hastened to inquire about the day's program and were not surprised to find that there had been no change in our orders. Since the air show did not begin until one o'clock, we had accepted an invitation for a swimming party. At 10:30 we were just starting out the door when the Skipper caught us. "We're going to fly!" he told us with a grin. "Our orders are the same as before: we are not to take-off until we start for home, but we're leaving today instead of tomorrow. However, the committee tells me that the Navy Department has no objections to our circling over the airport a few times, provided that we depart for Pensacola immediately!"

After apologizing to our waiting hosts by telephone, we packed hurriedly and then got together to decide what to do after we took off. Since we had not expected to take part in the Carnival, the only time we had flown together in these planes was an hour's loose cruising formation en route to Birmingham. Two hundred thousand people would be watching us perform in a few hours—and they would expect the standards of former Navy demonstrations—which had been presented only after days of painstaking practice.

Our Skipper wisely chose the simplest course. "Lieutenant Badger's section can do some formation work in the NJ's," he decided, "and we'll go through a dive-bombing routine in the Grummans. No loops, rolls, or anything fancy. Without practice, we'd probably botch it."

That was probably the first time that an air show routine was ever rehearsed in a hotel bedroom, but it went off without a hitch, and I doubt if anyone in the crowd could tell the difference. But even at that, I nearly spoiled it—and had a scare that will last me for a long while.

We didn't have much time to get ready and our planes had been sitting idle on the field for two days. We had only two mechanics with us who were assisted by airport attendants in servicing our planes. When I arrived at the airport, one of our own squadron mechanicians was warming up my plane, and I *took it for granted* that he had done all of the servicing.

Since we had no chocks for the wheels, we had to hold the planes steady with the brakes while we tested the engines. For this reason, I opened my throttle only far enough to see that the engine functioned properly on both magneto switches, then let it idle. If I had opened the throttle as wide as usual for this test, I'd have found out something that would have saved me considerable embarrassment later.

My engine was purring like a kitten. I reached for the rag I always carried

"I had to tell you some time, Joseph!"

in the side of the cockpit and removed a fleck of oil from the windshield. The airstream from the propeller caught the rag and whipped it out of my hand. I started to ask one of the airport attendants to get it for me, but he was busy with another plane, so I *let it go*. Remember that item.

A minute later we were taxiing down the concrete apron in front of the biggest crowd I had ever seen. I kept my engine throttled down as much as possible to avoid blowing dust into the crowd as we taxied by, otherwise I'd have found out what I was to learn a short time afterward.

We lined up with all six planes in a right echelon on the ground. The starting bomb exploded with a roar and the Skipper's plane started off down the runway. As soon as he was rolling, I eased my throttle forward and started to follow. An oily mist fogged my windshield. As I put on full power the oil sprayed back until I could no longer see through the glass.

By that time I was in the air and past the edge of the field. It was too late to turn back over a crowd like that. With the stick in my left hand, I was cranking the handle that retracted my wheels with my right. The Skipper's plane was on my left. I stuck my head out to keep it in view, and the left side of my goggles got a shot of oil that clouded the glass. Pulling up and over into my position on the Skipper's left I looked out of the right side. My goggles were now completely useless. I swept them off and out of the way and squinted out of one eye while I tried to keep in position.

Meanwhile, I expected my engine would quit any second. I knew the Skipper would be climbing for altitude and that my safest bet was to fly on him as long as possible until I could get the oil out of my eyes and see where I was. When I got a glance at the oil pressure gauge I was relieved to find that it was still up to normal. That made me feel a lot better. At least the engine might not quit right away.

My position was still pretty precarious. I could barely see, and I knew that the three planes behind us were closing rapidly to fly just above me in a tight formation. With one hand on the throttle and the other on the stick, I was busy trying to keep my position at the bottom of a steeply banked turn. I couldn't even wipe the oil out of my eyes until we got squared away on a straight course.

With the back of my shirt sleeve, I finally managed to wipe some of the oil out of my eyes. I cursed my carelessness in taking off without a cloth of some kind to wipe off the windshield. That little piece of greasy rag that I had allowed to blow away would have been worth its weight in pay-checks. Even my handkerchief was out of reach in my hip pocket, underneath the straps of my parachute.

Only the fact that we were still in formation saved me. As long as I could keep the Skipper's plane in sight, I was comparatively safe. But there were four vertical dives awaiting me, two in V formation and two in open attack formation. Before I had time to worry, we were in the first dive. I eased down farther than usual, so that I could keep the Skipper's plane in sight above the top of my clouded windshield. If I had stuck my face out into the slipstream in the vertical dive that followed the wind blast would have blinded me, for we were really going downhill in a hurry.

To my infinite relief, it worked. As we pulled out of the dive over the center of the field and zoomed back up for another dive, the Skipper looked over and raised his eyebrows questioningly. I nodded to indicate that everything was all right and he gave the signal for a left echelon. Red crossed over into position behind me

(*Continued on page* 82)

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Air Racing Is Hell!

(*Continued from page 12*)

Is that fellow giving his all, or has he a couple of tricks up his sleeve? This form of mental exercise maddens me. Then comes a rumor:

"I hear the boys are ganging up on you, Roscoe. They're going to box you, like they did that time at Los Angeles."

I start my own rumor. This is 1938, I have had hard luck for three years, I am faced with bankruptcy, I *have* to win.

"You let it out," I say, "that if anybody tries to box me up, I'll chew a fuselage apart with that fan of mine and then bail."

Comes the fateful morning of the race. A pilots' meeting at noon. Beefs, arguments, threats.

"Roscoe," I tell myself, "you've got to come through—or you're ruined."

It is ten minutes before the start. I have just gotten the signal. My ship is ready. The constant-speed propeller is revving slowly. Ten minutes to go.

Perspiration soaks me. I'm carrying a terrible load. I have a power loading of four pounds and a couple of points. Five thousand pounds of cantilever wing, fuselage, motor and gasoline. One thousand and two hundred horsepower in the nose to drag one man 300 miles. But my wing-loading is something to make an aeronautical engineer throw away his drafting board. Each square foot of wing and tail surface must lift 52 pounds!

My hands sweat on the stick. I start watching the instruments I'll use. Cylinder head temperatures. Oil temperature. Tachometer. Oil pressure. Supercharger gauge. Fuel pressure. I glance at my chronometer. The hands lie still. It has stopped. No, it runs. Nine minutes. Eight minutes. Seven minutes. Down to one minute.

Damn it! I can't control my feet. My leg muscles are making them jump up and down on the rudder pedals. They are my feet—but they're doing things without me telling them. I swear. I swear as those legs keep jittering, as the clock stops, as I think of my debts, as I look ahead, fly that course in my mind. Ships to each side of me. I will not be flying my own ship alone. I will be flying nine other stinging, snorting, streaking little hornets. I will fly them because I never know what the other fellow is going to do. And at 345 m.p.h., things happen so fast.

Supposing I conk? Supposing I disintegrate? Where on the course will I be? Hell! This can't go on.

The flash! The muscles in my legs stop jumping. I am cold and steady, and measuring everything that surrounds the world of my small cockpit in which I am buried so deeply. I slap the throttle wide. The ship sweeps ahead, shooting across the field, faster, faster, faster. At 100 she seems alive, aware of her controls. At 125 she lifts. As she leaves the ground, she jumps ahead like a bullet. The motor revs up. The ship will fly to pieces. I have used low pitch for full ground power. Now, with the drag of the wheels on the ground at an end, the motor revs up to 2,800-2,900. I must stop that. I pull the pitch down too low—2,000. I push it up to where I want it—2,600. Trees are whishing by beneath me. All beneath me is a streak. I am heading for the scatter pylon, flying my own ship and nine others. I spot them, count them. For more than one hour I must know where each ship is, for if I do not know, I am apt to tear into one, wind everything up.

Around the scatter pylon. My mind is working like clockwork now. The strips of adhesive are on the dash to be pulled off, one by one, as I shoot by the grandstands. Already I am preparing to look at the six-by-six-foot numerals—an innovation of mine—held up by the ground crew to verify what the adhesive tape tells me.

Onto the course at 300. Nothing matters now but those other ships, my own ship, my speed, my instruments, the landmarks, the ground, the pylons, whether my ship will stay together. Paramount is my motor. It must not suffer. It must not overwork. My instruments will tell me.

I fly slowly at first. That is, a little under the 345. With this load of gas, too much speed is apt to tear the wing off. You can't pull up for a bailout with your wing gone. I have been low in self-confidence—worried about myself. Now I'm all right. Three years of bad luck are over—if my luck holds. I sight on that slender tree after I've cleared the home pylon. I ease the throttle forward. That red roof is blurring by under me. It won't be long now to the next pylon. It's almost here. That green roof tells me. Wing up, wing down. I'm around. I've been spotting ahead, looking for ships on my course. Where's No. 8? I have a duck fit. I am going to have lots of duck fits in the next 200-odd miles, when I lose ships and wonder where they are in relation to myself. I get over the duck fit as I spot No. 8. But I still feel like a kitten on a hot stove.

Racing is an odd thing, I think. If I was up here alone, trying to get speed out of No. 29, I'd listen to that motor and it would scare the pants off me. I'd throttle back. Here I am, fanning out a motor as it's never been fanned out before. If Ortman, Wittman and the boys weren't grinding along with me, building up the thrill of competition—the self-pride of "I can do better than they can"—I'd throttle back, glide into the field and call it a day. But no. I stiffen my neck for another pylon. I ease into the almost vertical gently. Hell, this ship was never meant to carry this load and make sharp turns at 340. No, indeed. I goose the gun a little as I pull the angle out of the wing.

Yes, anything can happen. If you stop to think—but don't think. It's a hazardous profession, all right. Sure you know who's around you? Somebody may make an unintentional maneuver and it's curtains. Pull a strip off the instrument board. If you don't think this is a hazardous profession, you won't last long. You're exploring into speeds never tried before in a closed course race. Where in hell is Ortman? Another duck fit. And

(*Concluded on page 70*)

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and entry blank of this giant contest will be found in the

SEPTEMBER ISSUE

Popular Photography

NOW ON SALE

(*Continued from page 68*)

pretty soon I catch him, go by him, get out in front of him. Now, if I can only stay there. Cylinder head temperature okay. Oil pressure okay.

Say—this is my tenth year chasing pylons. Wonder where Mackey, my running mate, is in old Twenty-five? Remember 1935? Right now, that supercharger is turning around 32,000 r.p.m's. How can it take it? Brown roof. Big tree. Ready for the next pylon. Wing up slowly. Ships in the way?

Nice, this Thompson Trophy. None of the others, once having taken it, has ever come back for more. Wonder why? That makes me a veteran. Disqualified, 1933. Won in 1934. The ground crew's sign reads five. I check my adhesive. Five down it is. Motor blew in 1935. Wrecked my plane in the mountains, 1936. Oil temperature okay. Fuel pressure up. Leading until the last lap, 1937, thought I'd missed a pylon, dropped back to third. I'll win in 1938—today—right now.

I have to win. More turns. I'm well out in front. If I can just hold it. If that supercharger'll just keep on taking it. If I don't break an oil line. If I don't break a gas line. If I don't shed a wing. If I don't—— oh, hell!

Green roofs, red roofs, pylons, slender trees, more pylons, round and round, not going anywhere. They haven't boxed me yet. They can't box me. I'm gunning out ahead of all of them. Where's Wittman? Another duck fit. There's Mackey. Good old Twenty-five. The blue job. The red job. Ortman with a black fuselage and yellow wings. Round and round . . .

Fuller and Hughes and I. We're the only guys who own our own ships in the high horsepower class. We don't have to split with backers. I don't have to pay off—and it's a good thing because I need every cent. I goose the throttle ahead. This'll be a course record, unless . . .

Twenty-five . . . 26 . . . 27 . . . 28 . . . 29 laps. Now for the last one. The world is whirling, I'm standing still. A shake in the motor? No, not now. *Please,* not now. One lap to go. Pylon, house, tree, tree, house, pylon. Giddier by the minute and . . . I'm across!

I'll go around again, just to make sure I have not short-changed myself a lap. So I'm around again, down, bucking across the field, taxiing up to the wire-fenced pen to have my picture taken, my hand shaken, the cup given to me and the flowers put around my neck. I'm a wreck. I'm shaking again. I'm sweating under the blue coat. Hard. My hands are trembling. I hope nobody'll see it. I'll hide it with a big smile—forget my jumping pulse—my throbbing head—my aching body—the hellish exhaustion I feel . . .

Pretty soon it's all over. I can go now.

Mackey comes in.

"Great work, Roscoe!"

"Well, I made it. Now I can pay off. I can pay off . . ."

"I was worrying about my hotel bill myself," he says.

"Sure. Now I have to get ready for next year."

Sport? Hell.

END

"Routine Flight"

(*Continued from page 36*)

Lake Keuka and Hammondsport are over on our right and I remember the history-making flights that Glenn Curtiss made in the first flying boat on that water; the old *Red Wing.* I feel sorry the old *Pioneer* isn't with us to see what has developed from that ancient contraption—the Boeing Clippers, no less. And Hammondsport! The barnstormers used to pay a premium for Curtiss OX-5 engines made in Hammondsport rather than in any one of a number of plants that turned them out by the thousands during the War. They really were better, at that. . . .

According to plan, we're due over Buffalo at 2:10. This means we'd better begin descent at 1:55 in order to be over the Buffalo radio range station at 2,000 feet at that time. Company regulation is that let-downs shall not exceed 400 feet per minute and it's time to start down now. No need to roll the stabilizer forward, I can feel the nose getting heavier as the stewardess comes up to ask if we are going to make Buffalo on schedule. She has a man who wants to make a train to Toronto and the time is short for the connection and he is having a fit. The first officer gets the man's bag out and carries it aft to him so he can carry it out himself, saving time. I sneak in a message to Buffalo to have a special cab ready when we land. Maybe I'll be in a hurry sometime myself. As we go down the boost, of course, goes up and horsepower is adjusted for loss of altitude in descending just as it is in climb. Also, of course, the mixture ratio becomes leaner and that has to be watched. The grim square of the prison at Attica is just ahead and we turn slightly to the right. I don't like going directly over those places. A guard once took a pot-shot at me years ago because I didn't know there was a riot going on in the cooler and they were taking no chances.

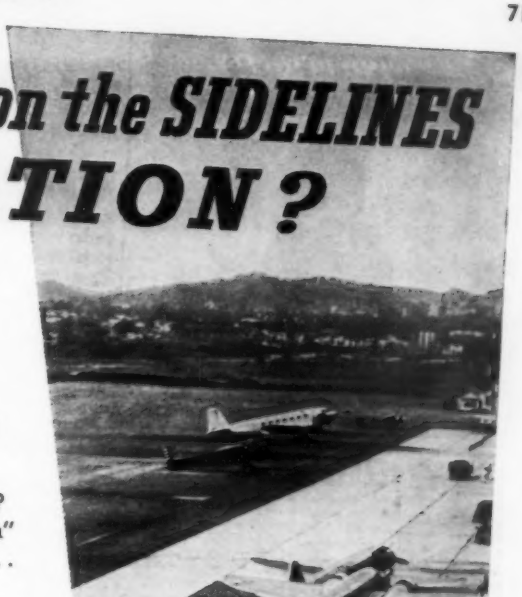
Here's where we begin to get the twilight of the east leg of Buffalo and the volume is turned down for two reasons. One, the strength of the two signals can more easily be determined and, two, my ears have taken a beating lo these many years of listening to this monotony and I hate to be screamed at when at the dinner-table.

Down to 2,000 feet and the First calls Buffalo: "In Range." Buffalo answers with his wind direction and velocity, barometer and pressure altitude, instructions about traffic around the field and the litany about "stay on the runways, avoid the ends and edges." It would be much simpler to put this stuff on a phonograph record (the field conditions, that is) and just turn it on into the mike—we all know what it is and it's never any different.

A left turn into the field, heading for the southwest runway and the order "wheels down" is given. The first officer pushes the lever down and we can feel

(*Concluded on page 72*)

Are You STANDING on the SIDELINES of AVIATION?



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(*Continued from page 70*)

the wheels as the landing gear extends itself into place. Gear pressure is up to normal and the green light appears on the instrument panel, he locks the latch and he calls out "I have a tire," meaning he can see his wheel in its proper place. Boost is reduced to 24 inches and props speeded up to 1,950, gas switched to fullest tank. Mixture controls are full rich, cross-feed valve is on and seat-belt sign on. About 800 feet high and half a mile from the end of the runway. Speed is reduced to 110 m.p.h. and the order for "flaps down" given. The ship slows down a bit and a little more power applied gives us the umph needed to set down on the runway just past the ever-present red flags at Buffalo. The runway is plenty long. We are one minute ahead of schedule and there's no need for it, so we don't use the brakes until the ship has slowed down enough to unlock the tail wheel and turn around to taxi to the ramp in front of the station. We didn't know what brakes on an airplane were in the old days and I don't like to use them any more than necessary. Just a rugged individualist, I guess, though there have been times when brakes were handy, sort of.

It's always best to get out of these airplanes through the front baggage-compartment door if the captain wants to get to the operations office in time to sign his clearance. Passengers linger in the aisle looking for hats, books, gloves or just looking. It's very bad form to shove them aside and yell "Gangway;" in fact, it's never done.

In the operations office at Buffalo the crew of Trip 10 are lounging about, telling lies (they had a tail wind anyhow) and the radio and teletype are making the air hideous with all the air transport jargon that goes on all the time, day and night. My clearance is ready and the weather section of this document shows all to be jake with nary a thunderstorm in the area between me and Chicago. Part of the routine of accepting a clearance is to revise the original flight plan to suit the change in winds aloft report or any change in the captain's plan other than that made at the originating point. So it is necessary to note on the clearance that it will take 1:34 at 6,000. Less head wind there than at 8,000 as originally planned. A glance out the window shows the fuel-truck pulling away from the nose of the ship and it's time to climb aboard through the baggage door. The red-capped porter shows a row of gleaming teeth as he thanks me for the box lunch I didn't eat and left for him on top of the baggage he had to handle.

And so—"Clear—Left!" The same routine at every station. Engines are started in the same way and we are flagged away for our second leg of a very uneventful trip to Chicago. Climbing out of Buffalo we head for Niagara Falls at about 2,500 feet. It really is an awe-inspiring sight even though seen for the thousandth time. Past the Falls, up goes the hood and it is time to do a little work for a change. Tuning in the Jarvis radio range, we head for it, pass over its cone of silence, report and change frequency to the Strathburn range. We fly over Canada between here and Detroit. Nice neighborly people, those Canucks. We couldn't fly over Mexico with the same ease, for instance. Down there you get a good and suspicious going-over. King's Highway No. 3 is off there to the right a bit. Most of those cars are American, a lot of them heading for Chicago. That's where we're going, only we could be there and back in New York again before those motorists got to Chicago. . . .

Well, there come Detroit's skyscrapers on the horizon. You can see the sun reflect off windows in the tallest buildings even before you see the buildings themselves. We're letting down slowly now. A little pressure on right rudder heads us toward Detroit City airport. I can see a couple of lightplanes circling over the field now. Got to watch out around busy airports. Lots of young fellows out flying around. Wind's northwest so we head for the northwest runway alongside the big gas tank in the middle of the airport—of all places to have a gas tank. Those newlyweds get off here. Guess Niagara Falls still is a swell place for a honeymoon. At least they were thrilled by it last time I talked to them back in the cabin. Well, they're home to settle down now.

On to Chicago. Easy and monotonous from here in. I see the sun sparking on Lake Michigan several minutes before we get within sight of the eastern shore. There's Chicago, all right. We're miles from home yet, but the almost solid blanket of dirt and smoke marks the city's position unmistakably. We sail over the Indiana sand dunes. Think I'd like to own one of those secluded cottages down there. Oh, well. . . . .

Routine, Routine! Practice, Regulations and Technique. New bulletins on this and that to be inserted in the manual. It would appear, in the cold light of reason, to be a most monotonous job. The so-called romantic angle has long since ceased to exist and this is a very serious business which brooks no mistake. But you ask any Captain flying the transport lines today how he would like to do something else!

END

Planes Before Trains!

TWO West Virginia cities—Glenville and Grantsville—are reversing the process of transportation development. They will have a direct airmail service before they have a railroad!

Both are on the new airmail route extending between Pittsburgh and Charleston, and Huntington, W. Va., over which All-American Aviation, Inc., of Wilmington, Del., is operating a regular daily airmail service to 30 cities in Pennsylvania, West Virginia and Ohio, using its new system by which airmail is picked up and delivered by specially equipped airplanes in flight.

Glenville, which has a population of 799, will have the added distinction of being the smallest town in the country to have a direct daily airmail service. The population of Grantsville is 1,800.

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THE AVIATION industry is making front page news daily. Aircraft companies are financing large expansions of manufacturing facilities. Congress appropriates millions for the purchase of airplanes and the construction of new air bases. Commercial aviation is growing rapidly. Transoceanic flights have become almost as commonplace as the hourly transcontinental trips of the "flying hotels," of the various air transport companies.

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Navy Buys Some Mud

(*Continued from page 43*)

Navy, and particularly the air arm, is being placed in a decent position to defend the Pacific Coast if it ever becomes necessary. A chain, they say, is as weak as its weakest link and, in about the same way, the strength of a defensive or offensive system depends largely on the strength and adequacy of the bases.

The late Captain Walter H. Allen, who, as 12th Naval District Public Works Officer began the Alameda base, a few months before his death summed up for this writer the reasons the station was considered essential. "San Diego," he said, "is overcrowded already. It would be completely jammed with the commissioning of the new carriers which are to bring us to treaty strength. The congestion is bad enough at the waterfront, but it is deadly in the air. Six carriers at one base means 500 planes drilling and that's impossible."

Why not train at sea? Well, land bases are necessary for a number of routine reasons: for gunnery, tactics, operations ashore, carrier landings from shore, night flying ashore, instrument flying ashore, and many other purposes. If the Navy had no land bases, all training would have to be carried on at sea—and that's inefficient and costly. The Navy has found that it's the best practice to have the carriers at a base eight months out of the year, and present with the fleet on maneuvers the other four. In other words, about two-thirds of the air training for carrier flight personnel ought to be performed ashore.

Here are the Navy's chief reasons for wanting the Alameda Base:

1. In case of emergency, this area is strategically vital. There are now no bases between San Diego and Seattle for patrol planes, none except at San Diego for carriers.

2. In peacetime, present training facilities are inadequate, for the carriers and for all kinds of air personnel.

As for the first reason, anybody can see (even a Congressman) what a hole in the western defense line the lack of a San Francisco Bay base leaves. If we were attacked, submarines would be sliding along off the Golden Gate faster than you could say "splice the main brace!" They'd be out there laying for merchant ships and it would be the duty of Navy patrol planes to spot them. With no San Francisco Bay station, these flying boats would have to operate from a base 800 miles away—and that's much too far.

As to Point No. 2, although San Diego can take care of some of the carriers it can't take care of all of them and, furthermore, there's no place on the Pacific Coast where they can actually tie up at a dock. When the new station is finished there will be only two such ports on the continent: Norfolk, Va., and Alameda, Calif.

The deciding advantage for the new site, of course, is the fact that it's in a land-locked deep-water bay, big enough to hold the whole fleet. The Golden Gate is strongly defended by Coast Artillery, and that's as it should be. Training stations and carrier bases should always be behind strong harbor defenses. And, just in case you have the wrong idea, this new base is not intended for the protection of San Francisco Bay, except very indirectly. That's the Army's job. The Navy's job is to fight at sea—and the Alameda air station will help it do that job when and if the time comes. Meanwhile, the sand and mud that you see today will be covered with planes and glory tomorrow. For this place, life begins in 1940.

END

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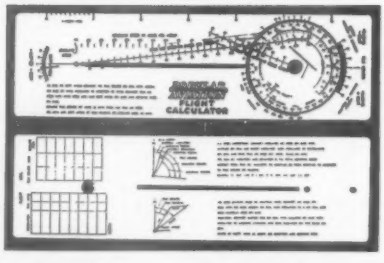

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Windshield Problem

(*Continued from page 64*)

This windshield seemed to meet most of the requirements of a completely successful one. However, the rather pointed V caused a slight instability of the lateral air flow.

To remedy this condition and to increase the upward and forward vision from the cabin the sharp V at the front of the windshield was supplanted by a small rearward-sloping triangular surface. The base of the windshield was not changed by this modification. The arrangement appeared to offer satisfactory turbulence characteristics and gave promise of fulfilling all the design requirements. Therefore a complete study was made of this improved arrangement.

These tests showed that it was practicable to design openings in airplane windshields which would permit an unobstructed view from the cabin and yet shield the pilot from wind and rain. The location and extent, of course, of this field of view faired with the windshield design. Openings up to two inches in width across a flat-front panel in vertical or slipping windshields would, it was found, permit a view directly forward without direct rain-drops entering if a small airfoil was mounted ahead of the windshield. A slight increase in the fuselage static pressure was necessary to keep wind and indirect raindrops from entering.

Furthermore, it was found feasible to design a modified V-front windshield with an open window on each side, back of the front window, that would afford a field of vision from the cabin over nearly the entire forward panorama without any appreciable amount of rain or wind entering the cabin even under ice-forming conditions. This style of opening used direct drop deflection through a small angle to provide forward vision. To prevent air currents blowing into these openings slight increase in the fuselage static pressure was found to be necessary. A simple gutter arrangement along the edges of the openings, it was discovered, prevented the indirect drops from entering the cabin. It will be seen, therefore, that this design offers a comparatively low resistance to the airstream and should be both satisfactory and practical as it entails very simple construction.

Hence in the very near future it is reasonable to suppose that many—if not most—airplanes will be built with the front-triangle modified V-shaped windshield having back of the curved outer edges of the V an unglassed opening on either side which will afford an opening protected from wind and rain through which a pilot may watch to keep his bearings and to land safely. This device will eliminate in some degree much of the "blind" flying that has heretofore been necessary in inclement weather and, axiomatically, will do much to make flying faster and safer and, hence, still more popular.

END

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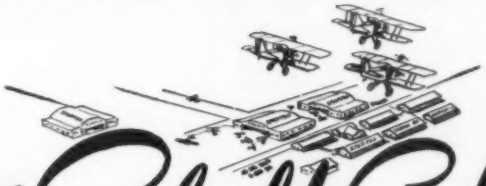

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Plane Laboratory

(Continued from page 27)

something we hope to solve.

"On a plane we get a record of the vibrations of the engine and propellers. For research on the propeller vibration the blades and shank of the propeller have cemented on them tiny carbon elements. Wires leading along the blades are connected with slip rings at the hub and photographic oscillograph devices give us a picture of the vibrations for the operating conditions. The oscillograph, of course, picks up the almost infinitesimal change in the propellers as shown by the deviation of the carbons.

"Increased trouble with flutter of wings and tail surfaces is something we bring on ourselves as we increase the size and speed of the ships. As we have to advance aircraft design, we have to cope with flutter conditions."

Other tests are made showing the temperature of the flight and auxiliary power plants. These tests include taxiing, take-off, engine climbs with some of the power dead at various speeds. The actual landing itself is done many times to check the landing gear and even if an ace pilot puts the ship down so nicely that a quarter cigar doesn't jiggle in an executive's pocket, there is a cathode ray oscillograph that catches the slightest bouncing.

Leaving the landing tests, we find that much investigation is carried on in the high altitude tests. Especially is this true in the case of the DC-4. Oxygen masks were worn by the "plane professors" in tests ranging from 15,000 to 25,000 feet. Garbed in these the engineers looked like characters from an H. G. Wells fantasy. On the DC-4 tests there was oxygen equipment for 14 men, although on some of the high altitude tests 18 men were taken up. Need for oxygen masks varies with the physical makeup of individuals and the four men without masks got along nicely with a "smoke" of oxygen from the other engineers. Incidentally, the term the engineers use when the masks are put on is "smoking oxygen" and a good whiff occasionally will get one back in top condition. Without this extra oxygen the men usually become very loggy and even as little effort as picking up a pencil or a piece of graph paper seems to be too much physical labor.

Results of high altitude tests on the DC-4 have given the giant ship a pressurized cabin which will have the inside air in a condition such as the plane would encounter at 11,000-12,000 feet, even though the DC-4 will be flying at 22,000 feet! One of the most important results of the high altitude tests showed the DC-4 can keep an altitude of 20,000 feet with three motors and even on two motors can hold up to 11,000 feet. One motor? Well, the chance of three motors failing at the same time has been worked out and the resultant figure runs into "light years!"

Testing in the sky classroom is a tremendous problem and involves the best minds in engineering. When the nut gets too tough for the boys to crack, Frank Collbohm, research and development engineer for Douglas, goes skyward to give his expert aid.

After the numerous tests are completed and the ship is passed as safe and all the improvements are the talk of the air industry, the commercial tests are the final ones made so that the new ship's sales talk can be compared to those of her older sisters. Fuel consumption data is highly important as a talking point for the sales department. The ship's ability to perform, now that all the kinks have been ironed out, is pushed the limit to answer every possible question put forth by a prospective purchaser. "Let the Buyer Beware" has gone with the old pusher planes.

Perhaps when the salemen have all the data and all the questions are marked "answered" the research men rush home to a very late dinner and then take the family out to catch an owl movie showing the mighty deeds of derring-do as the celluloid he-men act them out on a studio sound stage in front of a white sheet that will later become the cloud-spotted sky.

But as the motors of the screen planes roar in the ears of the patrons maybe the real test engineers, the wizards of the industry, are disregarding the action on the silver screen and are thinking about the major problem of icing and its effect on plane performance.

Icing, Al Reed told me, is the biggest problem the classroom in the sky has to solve at the present moment for icing of wings has caused many wrecks and, as Darius Green—who in the little red schoolhouse days poem leaped from a barn roof with a pair of homemade wings—summed up his experiences as a man with wings:

"Well, I like flyin' well enough . . . but the' ain't sich a thundering sight o'fun in 't when ye come to light!"

END

Planes Too Fast?

ANTHONY H. G. FOKKER, in an interview, asserted recently that transport aircraft today fly too fast, and that every further increase in speed means added danger to commercial aviation. Fokker also expressed his conviction that a mass air attack on a country cannot be stopped by any existing means of defense.

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The school, being of a Catholic nature, has a chapel with a pastor in attendance. Transportation is provided for those who wish to attend their denominational Churches in the adjoining city. Students are encouraged to participate in their various Church activities, and every available means is provided to facilitate this end.

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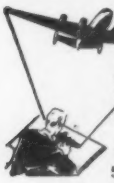
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Youngstown

(*Continued from page 62*)

80 cents per hour and putting 70 cents per hour into the reserve fund which totals several hundred dollars. So far, not a cent has been dipped out of that fund for unexpected costs.

Unlike so many other flying clubs, there is absolutely no chance that the club may cost any member more than his investment—and only the very, very slim chance that it may cost him that much. For the club has been incorporated by the Junior Chamber, and a trust certificate has been issued each member of the flying club. This relieves him of further liability.

The ship is fully insured for fire, theft, property damage and public liability and besides is two-thirds covered for any damage to it for any accident involving over $50 damage. In case of such an accident, regulations provide that the club must pay half of the uninsured third and the pilot responsible must pay the other half.

The club is set up on a one-year basis, the regulations providing that at the end of the year the club membership must vote on whether to continue or to sell the ship and distribute the money in the treasury, five per cent to each member.

Of course a member, dissatisfied or forced to withdraw for any reason, may realize something from his investment. The regulations require that he must offer the remaining club members an option on his share at half his original investment. If the other members fail to exercise the option within 30 days, he may sell his share at whatever price he can get—but the purchaser must meet other members' approval and must be a Junior Chamber member.

The regulations—and this really is unique in a flying club—grant czar-like powers to Seidner, at whose airport the plane is operated. He may, at his descretion, ground any member for wild or reckless flying, for any violation of any Civil Aeronautics Authority regulation or for any violation of any field or club rule, for non-payment of dues. Let it be said that not a single member has been disciplined and not a single complaint of a violation has been registered against a member.

Seidner also is charged with the responsibility of maintenance, repairs, keeping the plane gassed and cleaned up. He has the sole power to determine suitability of weather or other flying conditions, to determine whether the plane may leave the airport. He also collects the money for hourly use of the plane, making a settlement each week with the Junior Chamber treasurer.

Then the all-important question of whose turn it is to fly! Here, in many clubs, is where the real grief comes in. The plane's day is divided into half-hour periods and a schedule for it is maintained at the airport office.

Each member may reserve the ship for a half hour period—or even for two or three hours if no one else wishes it. By making a reservation a week or more in advance, a member may even take the ship for a full day or two—providing no written protests are made—and he is certified to make the intended flight.

Here again Seidner is granted broad judicial powers—those of deciding any disputes that may arise. But none has ever arisen—and the members co-operate eagerly to work out each others' time problems. "This club," said Seidner, "is an excellent example of the value of co-operation; of what the right kind of flying material can do."

Although three members of the club had had previous flying experience—two are private pilots and one is a solo pilot—Seidner recommends that ordinarily only those without previous experience should be admitted—and those to be admitted should be carefully scrutinized as to their aptness for flying and congenial nature.

"The reason," said Seidner, "for this requirement—and it is one of the most important requirements—is to start all members from scratch at the same time. It eliminates jealousy, keeps up the good work.

"At the same time, it helps to keep out the braggarts and show-offs—some of those who had previous time and are tempted to exhibit their superior skill and knowledge—and perhaps to goad the less expert flyers to the more dangerous tricks."

The club members, ranging in age from 21 to 40, include:

Seidner, the instructor; Eckert, the insurance salesman; Dr. B. N. Brandmiller, a practicing physician; Henry Kachel, a corporation attorney; William S. Robinson, a civil engineer; Arthur Waldman, coal yard proprietor; Harvey Litler, high school football coach; Michael Buddie, furniture store proprietor; T. Vincent Foster, radio broadcasting station time salesman; Martin Neff, Jr., distributor for a soft drink company; T. Edgar Bachner, steel mill clerk; Frank Flores, sweeper salesman; Ross Price, Mack Savage and William McFadden, salesmen; George R. Reiss, newspaperman; and Ralph Heberding, John Hill, Melvin Conrad and Rodney Meyers.

Where does Seidner come in? It has been an excellent business venture for him resulting in the sale of two airplanes, giving him the income for instruction, paying him hangar rent and a commission on the gasoline sales—and besides has brought him many new students, as well as additional charter and sightseeing business.

"This all shows," said Seidner, "that it is the volume business—in flying as well as in manufacturing automobiles or mousetraps—with a small, fair margin of profit that counts, not the small volume of business with an excessive margin of profit."

END

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Alaskans

(*Continued from page* 45)

wrecked but his radio was still in working order.

Ordinarily, in a situation like that the pilot loads up from his emergency grub box, but for some unknown reason the ship had neither rifle nor food. So he tried the radio, and raised the Star Office in Anchorage. Oscar Winchell was in the air near that point on another job, so Star told him to try and find Brown.

Brown couldn't see the sky and Winchell couldn't see the ground, but he did know about where Chet had gone down. So he flew back and forth over the fog until Chet heard his motor. With both radios working it was a simple matter for Oscar to position himself directly over the wreck. Then Oscar directed Chet as he walked out, dropped food to him after he had climbed to higher land, and gave him further directions to a native village some distance away.

Many times they find it possible to save a ship that has been forced down. Sometimes, if the landing is made in summer, they have to wait until the freeze-up and then fly the ship away; other times they can dismantle it and haul it in with dog teams or on boats. On other occasions it is just a question of flying out a spare part or two.

There is no instrument flying in Alaska. Unless they can see where they are going, they simply don't go. If it's too high to fly over a range of mountains they fly around or go through passes. I talked to a machinist from Seattle whose first flight of any kind was in a ship from Anchorage back to some gold mines at The Flat, 400 miles away. The route was across the Alaska Range, where peaks tower as high as 20,000 feet. As they went through a pass at 6,000, with mountains rising several thousand feet on either side, he began to shudder. Clouds settled closer and closer, but they slid on through sometimes less than 100 feet from the ground beneath.

Winter brings its own pet flying problems. Some of the fields are clear, requiring ships on wheels. Others require skiis. It often happens in spring or fall that a ship with wheels will fly down to the mud flats, change to skiis, take off and land on snow fields at higher altitudes.

A fledgling pilot named Toivo Ajo took off in Fairbanks one winter day in a Swallow equipped with wheels and headed for Anchorage. Headwinds used up his gas and he was forced to land on an emergency field at Willow, a station on the Alaska Railroad. The snow was four feet deep and he nosed over, but nothing was damaged.

He slept that night with Fred Everett, the cook, and loaded his tanks with gas in the morning. Then he found two long planks, nailed empty gas cans on one end and some large blocks on the same end but on the opposite side. Between them, Ajo and Everett got the wheels set on the planks behind the blocks, the gas cans holding the ends up at an angle.

He taxied to the end of the field, turned around and had to rig his skiis again. Then he started down the field, the ship rising on the home made skiis, and took off, the planks falling free. That ought to be enough adventure for a novice pilot on his first cross country jaunt, but there was more to come.

In Anchorage he found the wind so high he could not land; it was greater than his landing speed. So he flew around until some of the boys at the airport heard his motor. They lined up in two groups and Ajo flew his ship into the ground between them, throttling down until they could grab the wing tips and wheel him into the hangar.

Johnny Moore, one of Star's old timers, cracked a cylinder one winter day and had to land near Norton Sound. The temperature was 'way down, but somehow he managed to get the cylinder off, disconnect the rod and piston and fly the ship away. Another time he had to fly his ship down on the ice and hold it there against the wind with his prop while trying to cut holes in the ice to anchor it. But he might as well have let it go in the first place, because the gale caught him and whirled him away before the job was done. By the time he got back the ship was wrecked.

Estol Call is another old timer, although he is still in his early thirties. He has flown many a dog team, sewed up in gunny sacks, for hundreds of miles to save trappers weeks of travel through the snow. He has had his share of crashes. A year or so ago he took a photographer, clear over the top of Mt. McKinley after a Lockheed from Fairbanks had succeeded in reaching only 17,000 feet. He's still mad because a story of the flight, in a national magazine, did not give him any credit; the pictures taken on his flight were credited to the elaborately ballyhooed first attempt.

While the scheduled lines from Fairbanks to Nome, McGrath and Juneau have worked wonder in Alaskan communications, it is the charter pilots who really have opened up the country. Every spring they fly load after load of fishermen to Bristol Bay, Kuskokwim and other points were Alaska's salmon harvest is garnered (salmon is Alaska's most valuable export, worth even more than the annual gold pick-up). There are mines in operation that get all of their supplies and ship all of their gold by air. Prospectors back in the hills send out grocery orders by "moccasin telegraph" to the nearest radio station and in a day or two have their food dropped to them by air. I ate fresh potatoes in a prospect camp just a few miles from Tokachitna Glacier that had been dropped there a few days earlier. Formerly Dick Francis, the prospector, had to live all summer on what he could freight in by dog team in early spring and on what game he could kill.

On the day Joe and I flew from the

(*Concluded on page* 82)

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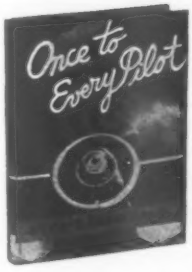

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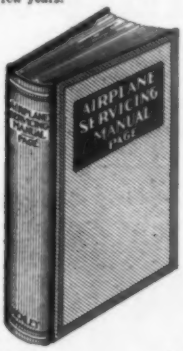

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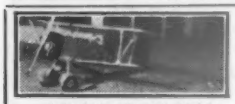

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(*Continued from page 80*)

Peters Creek mine with Chris, he had just completed a round trip from the mine to Anchorage to get a ring gear for one of the tractors repaired. The mine is a placer job, with a drag line scooping gravel into the gold washer. Their working year varies from 141 to 145 days; the rest of the time there is no water. Air service in getting this ring gear repaired in one day saved them from five days of non-production.

Even greater savings are made for miners ocateld in spots that are months from civilization except by air. A broken dredge for a mine on Kuskokwim Bay would have stopped operations for the rest of the season if it had not been for air and radio. Instead, the operator was flown to Fairbanks one day and back to Kuskokwim with spare parts on the second.

Commercial flying in the United States has become largely a job of engineering, but for many years to come the commercial wings of Alaska will still lead the way to high adventure.

END

I Learned About . . .

(*Continued from page 66*)

and we swung around over the field for the next dive. This one would be a lot harder.

The Skipper rocked his wings for the attack signal and whipped his plane over on its back in a quick *reversement*. As soon as he was clear I started down behind him, knowing that if I ever lost sight of his plane, I was stuck. As my plane gathered speed in the dive, I eased out to the right far enough to keep him in view. It may have looked a bit ragged from the ground but it saved the day for me. My oil pressure was still up and no more oil was flying back in my face.

By using this same procedure I managed to complete the remaining dives, and we circled the field to head for home. We eased out to open cruising formation and I wiped the oil and sweat out of my eyes. At last I was able to get at the handkerchief that should have been within easy reach in my breast pocket. I wiped off my goggles and was once more able to see over the windshield. There was a small rain-squall dead ahead, and as we plowed through it the driving rain cleaned most of the oil off of the windshield. All my instruments showed normal readings, so I settled back to relax, vowing never to get caught short again like that.

There was a good tail-wind and an hour later we were circling Corry Field at Pensacola. Back again on the ground, I found out what had caused all the trouble. In servicing my plane, someone had overlubricated the rocker-arms. If I had opened the throttle wide enough to check the engine properly, I would have discovered this before the take-off. If I had insisted on having chocks under the wheels, I could have opened up the throttle wide as I pleased—and if I had taken the trouble to retrieve the oil rag that I lost, or to have my handkerchief handy, I could have avoided a bad half-hour that nearly scared the daylights out of me.

But from now on, brother, here's one *piloto* who is not going to take-off again in a hurry. You can always change your mind before you get in the air but once your wheels are off the ground, you feel a whole lot more comfortable to know that everything is just right!

END

Weather Symbols

(*Continued from page 48*)

indicates fresh gusts, while a plus sign describes strong gusts.

Code figures used to represent total amount of sky covered by clouds are: 0 for no clouds, 1 for less than one tenth (few clouds), 2 for one-tenth, 3 for from over one-tenth to and including three-tenths, 4 for from three-tenths to and including six-tenths. This code extends on up to nine for sky obscure and not observable.

Elements normally sent but missing from the teletype transmission are noted with the letter M, which is entered in the report in place of the missing data.

Streamlined weather reports are certainly a far cry from yesterday's "corn-signals." Example of a modern teletype weather message is: CG8 X SPL 1612C E3V ⊕ 1/2VS 982/23/26 / 20— 945S+ OCNLY. Translation: Chicago, Ill., sky completely covered with clouds. Field closed. Special report. 4:12 p. m. C. S. T. Estimated 300 feet, variable. Overcast. Visibility ½ mile, variable. Moderate snow. 998.2 millibars. 28 degrees F. 26 degrees F. Wind is northeast, 20 miles per hour, fresh gusts. Barometer reads 29.45 inches. Snow occasionally heavy.

Here's another teletype message: CV8 N SPL 0020E 12 ⊕ 5Ø2T+ R+A+ 991/75/73→30+ ↖0015E 950 T + MOVG EWD. Translated, it means: Cleveland, O., sky completely covered by clouds. Satisfactory for instruments. Special report. 12:20 a. m., E. S. T. 1,200 feet (measured ceiling). Overcast, lower scattered clouds at 500 feet. Visibility two miles. Severe thunderstorm, heavy rain and hail. None except precipitation. 999.1 millibars. 75 degrees F. 73 degrees F. Wind is west, 30 m.p.h., strong gusts, moderate windshift from southeast at 12:15 a.m., E. S. T. 29.50 inches. Thunderstorm moving east.

All weather observations at controlled airports must fall in a classification as follows:

Class C: Contact. Weather equal or better than minima in accordance with contact flight rules.

Class N: Instrument. Weather less than minima specified for airport for contact flight, which requires a ceiling of 800 feet or more with visibility of three miles or more. Class N is below Class C minima but not below 500 feet ceiling and one mile visibility.

Class X: Closed. Below 500 feet ceiling and one mile visibility.

END

Airy Chat

(*Continued from page 8*)

we nevertheless were amazed at the facts turned up by our correspondents. We know there was a vitally important story to be told, but we had no idea we'd get what we found in the finished manuscript. Every word was so potent we felt it our duty to print all of it, despite the fact that this article runs considerably longer than the average POPULAR AVIATION manuscript. We intend seeing to it that every Congressman on the Naval Affairs Committee gets a copy of this issue. POPULAR AVIATION readers can help the cause of the Naval airman too by calling this article to the attention of their respective Congressman, whether they're on the Naval Affairs Committee or not.

* * *

ONE of the most unusual publications in aviation today is a catalogue! We spent an interesting half hour the other day looking through Karl Ort's highly original sales sheet. The darned thing is so well done and colorful we're inclined to advise you to read it, whether you're in the market for aviation cuff links or airplane tires or not.

* * *

THAT fledgling feature ("Have You Seen . . .?") we introduced last month is going great guns. At least that's what our mailbag tells us. We've gotten so many letters we can promise that you'll see that feature on the menu for some time to come. Besides satisfying the customers this new department is a great help to us. Many are the times in the past we've been caught with a hot new picture right smack on deadline. Ordinarily it would mean tearing up a whole page to get one picture in. Now, however, we've got several spots in each "Have You Seen . . .?" layout waiting for just such an emergency.

* * *

THE other week-end, we decided, was as good a time as any to rebel against having to ride a milk train almost six hours to go a mere 200 miles into Iowa where the folks have a farm. So we rented a nice new lightplane and, with a friend, flew out to the farm in a leisurely two hours and 10 minutes. Though we'd never flown out there before, we found the right road, flew up it to the farmhouse, circled a few times, then flew around the vicinity until we had selected one of several likely pastures nearby on which to land. The landing was uneventful, except that we had to keep a weather eye on some cows in the same field. Discovered later that it was the first time in the tiny town's well-recorded history that anyone had flown in for a visit, just like that. Nearest airport was about 50 miles away. Spent the next two hours showing what must have been the entire population through the ship.

* * *

Bet we could have sold 10 ships on the spot.

M. K.

END

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Naval Aviator

(Continued from page 60)

as most foreign air forces have been using Link trainers for years.

The excellence of its planes and engines has been attained almost in spite of the Navy. That the United States is as advanced as she is in aviation is a tribute to the skill and pioneering courage of its commercial engineers and manufacturers.

Navy red tape and hesitancy to try something radically new causes slow, painful progress. It took three years with Navy supervision, to engineer and construct a four-motored bomber at one commercial plant. Having stomached enough of this leisurely pace, the factory geared up its facilities to the high it was capable of, without interference, and 10 months after the idea was on draftsmen's boards another finished product, boasting an almost unbelievable advance in airboat performance, was in the air. Fearful that the fumbling admirals would, first, have scoffed at the idea; and second, even had they approved it, would have senselessly slowed down production, the company went ahead on its own and did a splendid job at a far lower cost.

The high command today still looks on aviation as an upstart and a usurper. The battleship men don't particularly care to allow aviation to develop unhampered to the extent of its ability. They hamstring its personnel with bigotry, prejudice and blind conservatism arising from ignorance of the real problems. Some, unfortunately, are concerned more with their own security than that of the nation. Rear Adm. Yates Stirling, Jr., retired, has forcefully brought attention to this evil. Being a retired admiral, his career is behind him; he can afford to criticize. But the Navy's junior aviators have to watch their step. A blunt statement, regardless of its truth, can well "wash them out" of the work they love.

Naval aviation policy today still is governed by a triumvirate whose primary interests are not in flying. The Chief of Naval Operations, the Chief of the Bureau of Navigation (who is in charge of personnel) and the Commander-in-Chief of the Fleet—whoever they may be from year to year—ordinarily have a vague, second-hand knowledge of flying. Yet it is they whose council bears greatest weight in determining the future status of aviation in the Navy.

Perhaps some logical and just procedure will evolve from the appointment of Jack Towers as chief of the Bureau of Aeronautics. Uncle Sam's young flyers fervently hope so. They know, at least, that the new chief is intimately acquainted with their problems.

The ability of an aviator is in direct ratio to his flying time. This is an old axiom of aviation which determines how airlines rate their flyers, how insurance companies figure risk.

They tell a story in the service of a typical desk pilot who could hardly make a complete circle over the station without cracking up. Why should he fly as long as he could hold down soft jobs on the ground and still hang on to his "wings"?

Comparatively late in his career, he suffered family trouble that upset him sorely. He adopted a "what-the-hell" attitude and actually started to fly, just like the men he had been commanding. It wasn't too long before he was acknowledged even by those who had previously referred to him with derision as a proficient pilot. He learned to fly by flying. Naval aviation must be guided by men who have learned about flying from flying.

END

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In design and construction the King's new airplane will closely resemble the standard model, which is in large production for airline operators throughout the world and for transport units of the Royal Air Force.

Man Under the Hood

(*Continued from page 49*)

Heard the other day that **B. B. "Buzz" Gragg,** United Air Lines official, was a professional musician before taking up aviation . . . he once played in **Paul Whiteman's** orchestra and made a vaudeville tour with **Jack Benny** . . . the instrument? . . . a sax . . .

* * *

We have it hot from the front that **Howard Hughes** was up in Seattle not long ago negotiating for a **Boeing** *Stratoliner* . . . it's said that he'll take a crack at a non-stop round-the-world flight with this ship . . . we understand the version of the *Stratoliner* Hughes has in mind will carry something like 5,000 gallons of fuel . . . which should more than get him around the world non-stop . . .

* * *

Lindbergh was at Wright Field the other day . . . and, among other things, he spent some time in and around the newest **Boeing** B-17B, which is an improved version of the Army's famed four-engined *Flying Fortress* . . . reliable authority tells us that Lindy calls this airplane "the finest bomber in the world today, including everything developed by any other nation" . . .

* * *

We're told by friends who know that the **German** pursuit airplanes now holding lots of world's records are not strongly built . . . in fact the safety factor is only five for these machines . . . pursuit airplanes built for the U. S. **Army** and **Navy** must have a safety factor of 12 . . . that's perhaps why the German ships are so light and also why the American planes do not come apart in the air . . . even after long dives.

* * *

All this stuff you've been reading recently about how **Army Air Corps** pursuit planes have been diving at speeds of 600 m.p.h. and thus setting new records is hooey . . . it's part of a new military aviation awareness program . . . in other words the **Army** at last wants to make the country Army-air conscious and is beginning to put out the old propaganda to do it.

Don't mistake us . . . we're not saying the stories as printed are untrue . . . what we say is that these speeds long since have been exceeded in dives by **Army** airplanes . . . a certain young engineering lieutenant at **Wright Field** involuntarily dived a **Consolidated** PB-2A pursuit plane at the scorching speed of 726 m.p.h. as long ago as 1936. The young man, testing one of the early turbo-superchargers, went up to 33,000 feet where his oxygen valve went haywire and he lost his oxygen tube . . . he cut the throttle and the heavy plane dropped out from under him in a steep, near-vertical dive . . . he momentarily passed out . . . when he could see again his air speed was registering 575 m.p.h. . . . when he got down, after easing the ship out of a 20,000 foot dive, he had this corrected for height, temperature and humidity . . . the corrections showed his speed to be 726 m.p.h. . . . also, **Lee Gehlbach** once dived a Navy Grumman fighter over 600 m.p.h. back in 1934.

All this stirs up an interesting point: *the purists from Langley Field and from experimental centers abroad say that airplanes cannot fly faster than* 650 m.p.h. . . . they say that when the machine reaches this speed the airflow over the wings is moving at more than 700 m.p.h., or above the speed of sound . . . and, they say, when the speed of sound is reached a bow-wave or burble develops that robs the wings of lift, increases the drag, and slows down the plane automatically . . . the pilots who have been in these high speed dives say the purists don't know what they're talking about.

END

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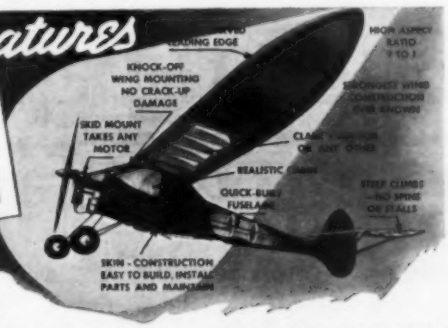
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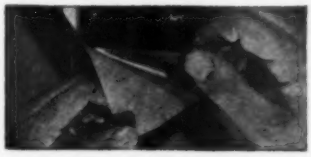

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Airyx

(Continued from page 20)

forth along the airlanes with daily regularity include news photographs and newsreels, electrotypes for advertisements, broadcast transcriptions, manuscripts, drawings, music and books. Mothers' day and Easter always bring an avalanche of flowers into the flow of business; Thanksgiving day a flood of table delicacies. At these times reserve planes are needed to supplement the 500 regularly in express service and the daily mileage flown soars well above the average of 200,116.

Emergencies and national catastrophes bring air express into the public eye more vividly than does the humdrum routine of this fast-expanding business. The hurricane of September, 1938, cut New England cities off from all communication except by radio and airplane and more than 86,000 pounds of air express—serums, food, clothing and emergency supplies—were flown into the area within a period of four days—including a consignment of one and a quarter tons of yeast, shipped to prevent a shortage of bread following the destruction of several yeast-producing plants. Last summer an epidemic of sleeping sickness among livestock broke out in several sections of the country, and veterinarians called for a vaccine that could only be obtained from a virus grown on chicken embryos. Over 10,000 eggs were flown to a laboratory at Pearl River, New York, each shipment timed to arrive when the eggs were on their twelfth day of incubation and from 40,000 to 50,000 doses of vaccine were shipped daily back to the diseased areas.

Sometimes a destructive insect attacks a crop without warning and speed is necessary if the blight is not to spread to other areas. One firm in California annually ships 40,000,000 to 50,000,000 ladybugs and other insects to all parts of the world and nearly all of these are sent by air express.

Frequently machinery breaks down and air express steps in to save the situation. A loss of $3,000 a day was being incurred recently by a firm constructing a railroad in Mexico because of numerous breakdowns. The firm called on a Milwaukee manufacturer, who air-shipped him 947 pounds of tooth points and bases for his sixteen power shovels. The shipment cost about $1,000, but saved the contractor at least ten times that sum. A factory at Belchertown, Massachusetts, was forced to close by the breaking of a 742-pound gear on a conveyor line. A new one was flown in from Chicago and several hundred men were able to return to work the next day. A Fanchon-Marco show that had moved from Portland, Oregon, to San Francisco, only to find that its baggage had been left standing in a Portland theatre, was held up only four hours while the 375 pounds of luggage were transported over 700 miles. A 17-year-old girl faced death in Los Angeles until a five-ounce package of a rare drug, made only in southern Germany, was flown across the continent to her after customs officials had held it in New York several days until the ban against Nazi imports could be circumvented by an interested Congressman.

Emergency shipments like these are handled now almost as a matter of routine. But there are many others, some humorous, some so strange as to be unbelievable, which cause concern and worry among even the most hardened pilots and airport officials.

Recently florists have begun to pack their airmail bundles of cut blossoms in boxes made of hard, transparent cellophane. These boxes are perfectly sturdy and able to hold their shape under great pressure, but they look so fragile that careful air express employees always take special pains with them, and usually place them on top of all the other bundles.

Live creatures also present frequent problems, although the rule that none can be carried which have an offensive odor or which would require feeding before they reach their destination, has narrowed the field a bit. Baby chicks are handled by the thousands, especially around Easter time, but they are not allowed to start a flight until they are 72 hours old. Tropical fish, rare insects and live lobsters are also frequent passengers; they must be, of course, well cared for in transit.

Two of the oddest shipments ever handled by the airlines reached New York almost simultaneously a few weeks ago, both bound for the World's Fair. The first was a tiny locket and a small cross, said to contain minute dust relics of the remains of Christopher Columbus, which an art dealer brought from San Francisco to place on exhibition. Plans for the showing were delayed, however, when a news dispatch from the Vatican announced that the ecumenical council might soon canonize Columbus, in which case the relics would take on a holy as well as an historical significance and a more appropriate disposition might be made of them. The other was Harwa, a 2,800-year-old mummy of a one-time overseer of wine cellars and granaries of the great farming estates of the Temple of Amon. Harwa, who has spent the most recent years of his existence in the Field Museum of Natural History in Chicago, is now on exhibition at the Fair where you can look through his ancient wrappings by pressing a button that turns on an X-ray machine. It would certainly be interesting if by some like magic one could delve into his thoughts and discover how this ancient man regarded the swift, ultra-modern service that whisked him half-way across the continent in less than six hours!

END

Doctors by Parachute

TWO hundred and fifty medical calls were made by parachute last year in the Soviet Union to isolated posts where there was no practicable landing field. This is part of an extensive medical service to remote regions, made possible by Soviet aviation developments, especially in regions within the Arctic.

Landing Devices

(*Continued from page* 56)

a 40 per cent decrease in lift.

It is known that a rotating surface gives more direct lift than a fixed surface. This principle is applied to two designs sketched in Section 15. One is a biplane which rotates its upper wing about a vertical axis when ready for landing. The other design is a monoplane which rotates its wing on a horizontal axis.

The viscosity of the moving air will rotate a free cylinder as indicated in Section 16. By placing a rotating cylinder or rotating discs into the leading edge of a wing, a great amount of air will be carried over the upper surface. Wind tunnel tests have shown they are one of the greatest high-lift devices.

Section 17 shows the caterpillar principle applied to carry the extra air over the upper surface.

Two methods that indicate great probabilities are sketched in Section 17. One is to evacuate the air on the upper surface, the other is to supply extra air—usually from a compressed air tank—to the turbulent region. The latter may be the introductory design of jet propulsion or rocket ships.

Section 18 shows a method of landing a plane in an air stream blowing over an airport. Trees are planted at the side of the stream to permit a safe landing with a side wind.

With all the high-lift devices attached to a plane, it could not land if the landing gear would not be strong enough to take the shock of the landing forces. The shock of the landing depends largely on the length of the travel of the shock strut. For approximation, the travel in inches should be equal to the square of the sinking speed in feet per second, divided by 10.

END

Regulation Changes

(*Continued from page* 22)

acrobatic maneuvers that may be used in an attempt to spin it.

3. The airplane shall be equipped with only two main air controls for the pilot to operate, one governing the longitudinal attitude of the airplane, and the other for turning, and both preferably operated by the pilot from the same control wheel or column. The stability characteristics of the airplane shall be such that turns, particularly at minimum speed, are made at the correct angle of bank with negligible slipping or skidding. Satisfactory directional control shall be obtained with power on or power off without the necessity of using a directional trim adjusting device.
4. The airplane shall be easy and simple to control under all conditions of flight. Trimming devices may be used for reducing control forces but sufficient control must be available regardless of the setting of the trimming device. Operation of auxiliary devices such as flaps shall not require an independent readjustment of a trimming device such as a horizontal stabilizer or a tab.

Minimum Field of View:

1. The airplane while standing or taxiing on level ground shall permit the pilot an unobstructed level view straight ahead and through a lateral sweep of approximately 90 degrees to each side without moving from a natural comfortable position, and by reasonable movement the pilot shall be able to see the ground within 20 feet ahead of the airplane. In addition, he shall have a sufficiently clear view forward, upward, and sideward to detect other aircraft in the vicinity.

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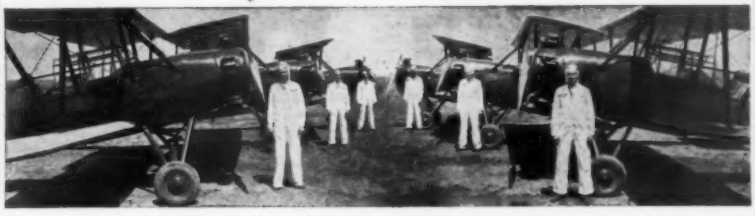

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Tex Rankin

(*Continued from page 30*)

trol from the rear seat, and between us, we figured out how we could get down to good old terra firma—and be able to walk away from the ship. We got it around, lost our altitude and lined it up on the field. Gradually we brought it in with the throttle and the flaps. The minute the wheels touched I went onto the brakes to keep the plane from ground-looping, sawing back and forth on them to steer straight. I held my breath, awaiting the worst. But I had a quiet wait, for nothing happened.

The landing was nearly perfect. The ship wasn't damaged. The only near casualty was my friend's wife, who, with a group, had watched the take-off. All had seen the rudder come loose, slam down on the elevator. She had fainted and, so excited had the spectators become at our predicament, they had all but called the coroner.

This experience, as I say, put more notes in my book, even if it did spoil the possibility of selling any of the little low-wing jobs in that part of the country for some time. There was, first of all, the lesson that one shouldn't lose his head. You need to think clearly when you are in a jam—and fast. The second is that there is usually a way out of practically any kind of trouble you get into while flying, providing the trouble doesn't result in violent maneuvers due to serious structural failure of the airplane itself. The third is that even without rudder or elevators it is possible to make a safe landing.

On the face of it, this sounds utterly impossible. In fact, it seemed impossible to me until I actually had the experience. So far as I know, no test pilot has ever gone aloft without them to see if it could be done—and I wouldn't recommend such procedure.

If you fly, there may be a few thrills ahead of you, just as there may be if you drive an automobile, sail a boat, play polo, ski, swim, play football or follow a hundred other jobs, sports and pastimes. Each one, if you will profit by it, will add to the store of information which will be of untold value to you and others in the future.

No mode of transportation is 100 per cent safe, not even an ox cart or baby carriage. However, it is my sincere belief that flying today is much safer than it was two or three years ago, and 1,000 per cent safer than it was at the close of the war more than 20 years ago.

END

De Mille, the Airman

(*Continued from page 40*)

called. "I got over fog. The sun made a rainbow around my plane's shadow on the fog. The phenomenon frightened and fascinated me. I got so interested watching it that fog closed in.

"'Isn't it beautiful!' Miss Faye called.

"It wasn't to me. Sweat was soaking me. I was up there. I cruised around for an hour trying to figure a way down. Once I tried to come down through it. As luck would have it, I was descending the big dip in a roller coast called 'The Race Through the Clouds' at Venice. Miss Faye raised her hands above her head and clapped them. She thought I was being cute.

"I was just about out of gas when I found a hole and made it back to the field."

There were now a dozen planes on DeMille fields. Jimmy Doolittle, famed speedster, was among the score or so pilots who worked at the field in various capacities. Hangars stretched for a quarter of a mile or more. Business was booming. And so were expenses.

Just about this time, DeMille suffered his only crack-up. At night. And walked away from it. Tony Lynch was teaching him night flying and, at the end of the lesson, Lynch throttled back and announced that he'd take over and land. DeMille held his hands in the air to show him he agreed.

"He landed all right," DeMille said. "He overshot and tried to whip out of it with the motor. The motor wouldn't carry it, and first we hit a fence, then a signpost and finally a eucalyptus tree, taking off both wings."

This in no whit discouraged the producer-director. He was up again in no time. And business went booming along until 1922, when DeMille suddenly discovered that the boys in the bookkeeping department were doing it all in red ink. DeMille called the stockholders together and paid them off. That kindly gesture cost him between $250,000 and $300,000.

"I decided that after all I was a motion picture director, not an airline operator, so I quit," he explained.

Later he sold all his equipment save the Jenny (which he continued to fly) to Emery Rogers. By this time there were plenty of buyers. DeMille had pioneered and the rest had followed along.

"No matter what it cost me it was worth every cent," he said. "It was thrilling, adventuresome, satisfying. And, more important, I think the company got thousands interested, thousands into the air, and helped pave the way for the development of today. That's what really counts."

DeMille stopped flying in 1925 at Adolph Zukor's insistence, and devoted himself to pictures, as already chronicled. However, he retains all of his enthusiasm. In 1934 he piloted a Lockheed from El Paso to Los Angeles with Paul Mantz standing by, and later he flew a twin-motored job owned by an oil company from Los Angeles to the Hearst ranch, 250 miles from Hollywood, with co-pilot at hand.

"I may own a ship again, but I won't be flying it because I'm too busy to fly consistently—and you have to do that to keep your hand in," DeMille said.

I pointed that, because of his pioneering, his flying and his understanding of the business, he should give America a real epic of aviation. He already has proved his ability to put a saga of the railroads on the screen: "Union Pacific."

"The answer to that," he replied, "is 'maybe'."

END

Potent Warplane

BATTLE strength of Britain's air force, which is charged particularly with protection of the home country against bombers, is augmented by the addition to squadron equipment of a new two-seat fighter monoplane. Outstanding feature of the aircraft—the Boulton Paul *Defiant*—is the exceptionally powerful armament mounted in a gun turret for the engagement of enemy raiders. The Air Ministry has placed large orders for the *Defiant*, which is believed to be the fastest military airplane in its category.

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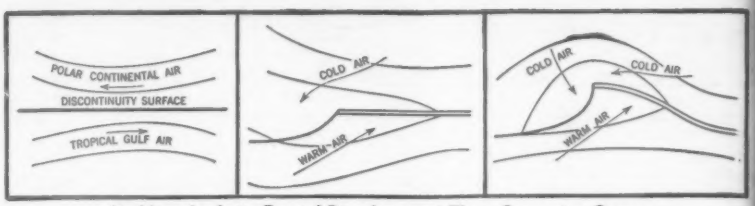

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